



June 18, 2020

Manuel Oliveira
Manuel Oliveira Dairy
4235 Oak Avenue
Merced, CA 95340

Re: Notice of Preliminary Decision - Authority to Construct
Facility Number: N-8441
Project Number: N-1183853

Dear Mr. Oliveira:

Enclosed for your review and comment is the District's analysis of Manuel Oliveira Dairy's application for an Authority to Construct for modification of the dairy to install two freestall barns, two shade barns over existing corrals, windbreaks, mechanically aerated treatment lagoons, replace the existing milk parlor, and increase the quantity of milk and dry cows by 1,860 heads and support stock by 599 heads, at 4235 Oak Avenue in Merced, CA.

The notice of preliminary decision for this project has been posted on the District's website (www.valleyair.org). After addressing all comments made during the 30-day public notice period, the District intends to issue the Authority to Construct. Please submit your written comments on this project within the 30-day public comment period, as specified in the enclosed public notice.

Thank you for your cooperation in this matter. If you have any questions regarding this matter, please contact Mr. Kai Chan of Permit Services at (209) 557-6451.

Sincerely,



Arnaud Marjollet
Director of Permit Services

AM:kc

Enclosures

cc: Courtney Graham, CARB (w/ enclosure) via email

Samir Sheikh
Executive Director/Air Pollution Control Officer

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San Joaquin Valley Air Pollution Control District

Authority to Construct Application Review

Dairy Expansion

Facility Name: Manuel Oliveira Dairy
Mailing Address: 4235 Oak Avenue
Merced, CA 95340

Date: June 15, 2020
Engineer: Kai Chan
Lead Engineer: James Harader

Contact Person: Manuel Oliveira

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Application #(s): N-8441-1, '-2-1, '-3-2, '-4-1, and '-5-1

Project #: N-1183853

Deemed Complete: August 7, 2019

I. Proposal

Manuel Oliveira Dairy has requested Authority to Construct (ATC) permits to expand its existing dairy operation as follows:

- Modification of the 910 cow milking operation with one 30 stall herringbone milking parlor (Permit Unit N-8441-1) to increase the number of milk cows to 2,500 heads and replace the existing milking parlor with a 60 stall parallel milking parlor.
- Modification of the cow housing with 910 milk cows not to exceed a combined total of 1,040 mature cows (milk and dry), 901 support stock (heifers, calves, and bulls), and two freestalls with flush system (Permit Unit N-8441-2) to increase the maximum number of cows to 2,500 milk cows not to exceed a combined total of 2,900 mature cows (milk and dry) and 1,500 support stock (heifers and calves), and install two new freestall barns (5 & 6), two shade barns (1 & 2) over existing corrals, calf hutches, and windbreaks at the west and east side of the cow housing area at the facility.
- Modification of the liquid manure handling system consisting of one settling basin; two storage ponds; mechanical separator(s); manure is land applied through furrow irrigation (Permit Unit N-8441-3) to install three treatment lagoons with mechanical aerators and increase the liquid manure processing due to a change in herd profile as authorized by ATC permit N-8441-2-1.
- Modification of the solid manure handling system consisting of manure stock piles; solid manure application to land (Permit Unit N-8441-4) for an increase in solid manure processing due to a change in herd profile as authorized by ATC permit N-8441-2-1.

- Modification of the feed storage and handling consisting of covered feed storage or commodity barn(s) and silage pile(s) (Permit Unit N-8441-5) for an increase in total mixed rations due to a change in herd profile as authorized by ATC permit N-8441-2-1.

Disposition of Outstanding ATCs:

ATC permits N-8441-1-0, '-2-0, '-3-1, '-4-0, and '-5-0 have been implemented and serve as the base document. Current PTOs N-8441-1-0, '-2-0, '-3-1, '-4-0, and '-5-0 are included in Appendix B. A project site plan indicating the proposed modifications is included in Appendix C.

II. Applicable Rules

Rule 2201	New and Modified Stationary Source Review Rule (8/15/19)
Rule 2410	Prevention of Significant Deterioration (6/16/11)
Rule 2520	Federally Mandated Operating Permits (8/15/19)
Rule 2550	Federally Mandated Preconstruction Review for Major Sources of Air Toxics (6/18/98)
Rule 4001	New Source Performance Standards (4/14/99)
Rule 4002	National Emissions Standards for Hazardous Air Pollutants (5/20/04)
Rule 4101	Visible Emissions (2/17/05)
Rule 4102	Nuisance (12/17/92)
Rule 4550	Conservative Management Practices (CMP) (8/19/04)
Rule 4570	Confined Animal Facilities (10/21/10)
CH&SC 41700	Health Risk Assessment
CH&SC 42301.6	School Notice
Public Resources Code 21000-21177: California Environmental Quality Act (CEQA)	
California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387: CEQA Guidelines	

III. Project Location

The facility is located at 4235 Oak Avenue in Merced, CA. The equipment is not located within 1,000 feet of the outer boundary of a K-12 school. Therefore, the public notification requirement of California Health and Safety Code 42301.6 is not applicable to this project.

IV. Process Description

The primary function of the proposed facility will be the production of dairy milk, which is used to make various food products, such as fluid milk¹, butter, cheese, ice cream, and yogurt. Production of milk requires a herd of mature dairy cows that are lactating (milk cows). A cow's lactation cycle starts shortly after calving and lasts for approximately 12 months. Typically, a 10-month lactation period is followed by a 2-month non-lactation (dry cow) period, during which the cow prepares to calve again and begin a new lactation cycle. After the first few lactation cycles, the cow's milk yield is expected to decline steadily with each subsequent cycle.

¹ Milk that has been processed in various ways (e.g. pasteurization, homogenization, fortification, etc.) and is intended to be consumed primarily as a beverage.

Female calves are retained in the herd while the male calves are sold off for meat production or other purposes. The calves take approximately 15 to 24 months to reach reproductive maturity, at which point they enter the milk production stream as bred heifers. Thus, in addition to the mature cows (milk and dry), a typical dairy herd also includes a certain proportion of calves and heifers at various stages of development (support stock). Mature cows that are culled from the herd (primarily due to diminishing milk yield, but also due to injury, disease, or other reasons) are replaced by the bred heifers entering the milk production stream. The support stock may also include a certain number of mature bulls for breeding purposes, although this is not common due to the prevalent use of artificial insemination.

The primary functions involved in the day to day operation of a dairy include housing and feeding the herd, milking, and management of manure. These functions are described in more detail in the following sections:

Milking Operation (Permit Unit N-8441-1):

Milking is a dairy's primary income generating activity. The lactating cows at this facility are milked two times per day. The milk is chilled and temporarily stored in onsite tanks until it is collected by tanker truck for delivery to a creamery. A purpose-built structure known as the milking parlor is used for milking and the associated onsite milk handling activities. The milking parlor is located in proximity to, but separate from the lactating cow housing areas. It is designed to facilitate efficient in-and-out movement of groups of cows being milked; and also to allow workers access to individual cows during milking. The first part of the milking parlor, known as the holding area, is an open-sided roofed space where cows that are ready for milking are temporarily confined as they enter the milking parlor. The milking occurs in the milking parlor within the barn. There are several different parlor designs, including flat, parallel, herringbone, and rotary. Manuel Oliveira Dairy currently has a 30-stall herringbone milking parlor.

With this project, the dairy will replace the existing 30-stall herringbone milking parlor with a new 60-stall parallel milking parlor and increase the number milk cows from 910 heads to 1,630 heads. The lactating cows will be milked two times per day. The milking parlor has concrete floors sloped to a drain. Manure that is deposited in the milking parlor will be sprayed or flushed into the drain using fresh water continuously in the milking parlor. The effluent from the milking parlor will be carried through pipes to the lagoon system.

Cow Housing (Permit Unit N-8441-2):

The facility currently utilizes two freestall barns (Freestall Barn 3 and 4) with flush lanes to house milk cows and dry cows. In the freestalls, the cows are grouped in large pens with free access to feed bunks, water, and stalls for resting. A standard freestall barn design has a feed alley in the center of the barn separating two feed bunks on each side. The facility is proposing to install two new freestall barns (Freestall Barns 5 and 6) to house 600 milk cows.

The facility currently also utilizes eight open corrals to house support stock (heifers). Open corrals are large loose dirt open areas where cows are confined. These corrals have paved feed lanes. Manure from the feed lanes will be removed by flushing or scraping, whereas manure from the unpaved surfaces of the corrals will be removed by scraping with a box-type scraper.

The facility is proposing to install two shade barns (Shade Barns 1 and 2) over the existing corrals to house 400 dry cows and 905 support stock (heifers). The shade barns or loafing barn are housing structure consisting of a large fenced confinement area with paved feed lanes and a roof-type shade structure over the entire area. Manure from the feed lanes is removed by flushing, whereas manure from the unpaved surfaces is removed by scraping with a box-type scraper. All of the open corrals will be replaced with the new freestall and shade barns.

Calves (0 - 3 months old) are housed in aboveground hutches and the manure removed by scraping. Hutches typically house individual calves or a small group of calves, depending on the age of the calves and the degree of care required. All hutches are grouped together (in rows) in a calf-housing. No changes are being proposed to the calve hutches.

Liquid Manure Handling System (Permit Unit N-8441-3):

Milk cows generate anywhere from 130 to 150 pounds of manure per day. The manure is deposited primarily in areas where the cows are housed and fed (cow housing), but a small amount is deposited in the milking barn and other transit areas. The manure is collected and managed in liquid and solid forms. Manure with a total solids content of 20% or higher usually can be handled as a solid, while manure with a total solids content of 10% or less can be handled as a liquid.

The existing manure handling system consists of one settling basins, two storage ponds, and mechanical separator(s). The manure is land applied through furrow irrigation.

Settling Basins:

The liquid manure from the flushed lanes will flow to the settling basins for solids separation prior to entering the lagoon. Settling basins are structures designed to separate solids from liquid manure by sedimentation. The inflow of manure is restricted to allow some of the solids to settle out. A settling basin may achieve a solids removal rate of 40-70%. The liquids from the settling basins will gradually drain to the treatment lagoons. Solids remaining in settling basins are left to dry and then are removed. The separated solids will either be incorporated into cropland or stored for use as fertilizer.

Storage Pond:

The facility has one storage pond. The storage pond are designed to have sufficient volume to hold all of the following: all manure and wastewater accumulated at the dairy for a period of 120 days; normal precipitation and any drainage to the lagoon system minus evaporation from the surface of the lagoon; and precipitation during a 25 year, 24 hour storm event. The liquid manure from the storage pond will be used to irrigate crops.

Solids Separation:

Flush water from the milk barn and housing areas is collected into a processing pit near the mechanical separators. The flush water is periodically agitated and pumped over the mechanical separator screens. The liquid passes through the screens and flows into the

liquid manure storage ponds. The solids fall off the bottom of the screen onto a stacking pad, from where they are later removed by a front end loader and spread out to dry on the drying pads.

Land Application:

Liquid manure from the storage pond will be applied to cropland as fertilizer/irrigation water. The application is done through flood irrigation, at agronomic rates in conformance with a nutrient management plan that has been approved by the Regional Water Quality Control Board.

Aerobic Treatment Lagoon or Mechanically Aerated Lagoon

An aerobic lagoon is a waste treatment lagoon that is designed to facilitate the decomposition of wastewater by microbes in the presence of oxygen (O_2). The process of aerobic decomposition results in the conversion of organic compounds in the wastewater into carbon dioxide (CO_2), and (H_2O), nitrates, sulfates, and inert biomass (sludge). The process of aerobic digestion is sometimes referred to as nitrification (especially when discussing NH_3 transformation). Complete aerobic digestion (100% aeration) removes nearly all malodors and also virtually eliminates VOCs, H_2S , and NH_3 emissions from liquid waste.

In completely aerated lagoons sufficient oxygen must be provided to sustain the aerobic microorganisms. NRCS Practice Standard Code 359 specifies that naturally aerobic lagoons have a minimum surface area determined by regional climate and daily Biological Oxygen Demand (BOD_5) and requires the depth of naturally aerobic lagoons have a maximum depth no greater than five feet. For mechanically aerated lagoons NRCS Practice Standard Code 359 specifies that the aeration equipment shall provide a minimum of 1 pound of oxygen for each pound of daily BOD_5 loading. The mechanical aerators that provide the required oxygen may float on the lagoon surface or be submerged in the lagoon. Aeration can also be performed by injection of tiny air bubbles into the lagoon water, mixing of the lagoon water, or spraying of the water into the air.

Manuel Oliveira Dairy has proposed to install and use three mechanically aerated lagoons that meet the aerobic treatment design requirements discussed above.

Solid Manure Handling (Permit Unit N-8441-4)

Solid manure is stored in stockpiles until ready to be applied to cropland as fertilizer, or shipped offsite. Separated solids are dried and stockpiled for use as bedding material in the freestalls.

Feed Storage and Handling (Permit Unit N-8441-5):

The existing feed storage and handing operation consists of commodity barns and silage piles.

Commodity Barns and Silage Piles:

The feed consists primarily of silage, which is made from corn, oats, and alfalfa, or a variety of other feed crops. The silage is made by placing the harvested crops, chopped to desired

pieces if necessary, into piles, which are then compacted with heavy equipment to remove air. The piles are then tightly covered to avoid reintroduction of air. This allows anaerobic microbes present in the crops to multiply, resulting in fermentation of the organic material in the feed. When the silage is ready, one end of the pile can be opened and the required amount of silage can be removed from that end on a daily basis.

In order to provide the right nutritional balance, silage is usually blended with other feed additives, such as oils, whey, seeds and grains, nut hulls, and various salts and minerals before it is fed to the cattle. These additives are usually stored in commodity barns to avoid exposure to weather.

Total Mixed Rations (TMR):

TMR refers to a blended mixture of silage and additives that is ready to be fed to the cattle. Most cattle facilities prepare their TMRs in small batches using a feed wagon equipped with a mixer. The silage and additives are placed in the feed wagon in the proportions prescribed by the dietary requirements of the group of cows to be fed. These ingredients are then thoroughly mixed in the wagon and delivered to the cow housing areas to spread the TMR along the feed lanes.

V. Equipment Listing

Pre-Project Equipment Description:

- N-8441-1-0: 910 COW MILKING OPERATION WITH ONE 30 STALL HERRINGBONE MILKING PARLOR.
- N-8441-2-0: COW HOUSING - 910 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 1,040 MATURE COWS (MILK AND DRY); 901 SUPPORT STOCK (HEIFERS, CALVES AND BULLS); AND 2 FREESTALLS WITH FLUSH SYSTEM.
- N-8441-3-1: LIQUID MANURE HANDLING SYSTEM CONSISTING OF ONE SETTLING BASIN, TWO STORAGE PONDS, MECHANICAL SEPARATOR(S). MANURE IS LAND APPLIED THROUGH FURROW IRRIGATION.
- N-8441-4-0: SOLID MANURE HANDLING CONSISTING OF MANURE STOCK PILES; SOLID MANURE APPLICATION TO LAND.
- N-8441-5-0: FEED STORAGE AND HANDLING CONSISTING OF COVERED FEED STORAGE OR COMMODITY BARN(S) AND SILAGE PILE(S).

Proposed Modification:

The facility is proposing to replace their existing milk parlor with a 60 stall parallel milking parlor, install two new freestall barns, two shade barns over existing corrals, install windbreaks at the cow housing area, install three mechanically aerated lagoons, and increase the number of milk and dry cows by 1,860 heads, support stock by 379 heads, and calves by 220 heads.

- N-8441-1-1: MODIFICATION OF 910 COW MILKING OPERATION WITH ONE 30 STALL HERRINGBONE MILKING PARLOR TO INCREASE THE NUMBER OF MILK COWS TO 2,500 HEADS AND REPLACE THE EXISTING MILKING PARLOR WITH A 60 STALL PARALLEL MILKING PARLOR.
- N-8441-2-1: MODIFICATION OF COW HOUSING - 910 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 1,040 MATURE COWS (MILK AND DRY); 901 SUPPORT STOCK (HEIFERS, CALVES AND BULLS); AND 2 FREESTALLS WITH FLUSH SYSTEM TO: INCREASE THE MAXIMUM NUMBER OF COWS TO 2,500 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 2,900 MATURE COWS (MILK AND DRY) AND 1,500 SUPPORT STOCK (HEIFERS AND CALVES); INSTALL TWO NEW FREESTALL BARN (5 & 6), TWO SHADE BARN (1 & 2) OVER EXISTING CORRALS, CALF HUTCHES, AND UPWIND/DOWNWIND WINDBREAKS.
- N-8441-3-2: MODIFICATION OF LIQUID MANURE HANDLING SYSTEM CONSISTING OF ONE SETTLING BASIN; TWO STORAGE PONDS; MECHANICAL SEPARATOR(S); MANURE IS LAND APPLIED THROUGH FURROW IRRIGATION TO INSTALL THREE MECHANICALLY AERATED LAGOONS (391'X200'X10', 284'X203'X7', AND 345'X200'X7') AND INCREASE LIQUID MANURE PROCESSING DUE TO A CHANGE IN HERD PROFILE AS AUTHORIZED BY ATC PERMIT N-8441-2-1.
- N-8441-4-1: MODIFICATION OF SOLID MANURE HANDLING CONSISTING OF MANURE STOCK PILES; SOLID MANURE APPLICATION TO LAND FOR AN INCREASE IN SOLID MANURE PROCESSING DUE TO A CHANGE IN HERD PROFILE AS AUTHORIZED BY ATC PERMIT N-8441-2-1.
- N-8441-5-1: MODIFICATION OF FEED STORAGE AND HANDLING CONSISTING OF COVERED FEED STORAGE OR COMMODITY BARN(S) AND SILAGE PILE(S) FOR AN INCREASE IN TOTAL MIXED RATIONS DUE TO A CHANGE IN HERD PROFILE AS AUTHORIZED BY ATC PERMIT N-8441-2-1.

Post-Project Equipment Description:

- N-8441-1-1: 2,500 COW MILKING OPERATION WITH ONE 60 STALL PARALLEL MILKING PALOR.
- N-8441-2-1: COW HOUSING – 2,500 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 2,900 MATURE COWS (MILK AND DRY); 1,125 SUPPORT STOCK (HEIFERS); 375 CALVES (0-3 MONTHS) IN ABOVEGROUND HUTCHES; 4 FREESTALL BARN AND 2 SHADE BARN WITH FLUSH/SCRAPE SYSTEM; WINDBREAKS AT THE WEST AND EAST SIDE OF THE COW HOUSING AREA.

- N-8441-3-2: LIQUID MANURE HANDLING SYSTEM CONSISTING OF ONE SETTLING BASIN; MECHANICAL SEPARATOR(S); TWO STORAGE PONDS; THREE MECHANICALLY AERATED LAGOONS (391'X200'X10', 284'X203'X7', AND 345'X200'X7'); MANURE IS LAND APPLIED THROUGH FURROW IRRIGATION.
- N-8441-4-1: SOLID MANURE HANDLING CONSISTING OF MANURE STOCK PILES; SOLID MANURE APPLICATION TO LAND AND/OR HAULDED OFFSITE.
- N-8441-5-1: FEED STORAGE AND HANDLING CONSISTING OF COVERED FEED STORAGE, COMMODITY BARN(S), AND SILAGE PILE(S), AND TOTAL MIXED RATION FEEDING.

VI. Emission Control Technology Evaluation

Particulate matter (PM₁₀), volatile organic compounds (VOC), hydrogen sulfide (H₂S) and ammonia (NH₃) are the major pollutants of concern from dairy operations. PM₁₀ emissions are generated primarily from the mechanical action of cows' hooves on dust and dry manure, which is subsequently picked up by wind and entrained into the atmosphere. VOC emissions are generated from the ruminant digestive process (i.e. enteric emissions), decomposition and fermentation of feed, and decomposition of organic matter in manure. NH₃ and H₂S emissions are generated from microbial metabolization of nitrogen and sulfur compounds in manure. The quantity of these emissions depends directly on the herd size and profile.²

Various management practices are used to control emissions at this dairy. Some of these practices are discussed below:

Milking Parlor (Permit Unit N-8441-1):

This dairy uses a flush/spray system to wash out the manure from the milking parlor after each group of cows are milked. Since the milking parlor is constantly flushed, there will be no particulate matter emissions from the milking parlor. Manure, which is a source of VOC emissions, is removed from the milking parlor many times a day by flushing after each milking. Because of ammonia's high affinity for and solubility in water, volatilization of ammonia from the milking parlors will also be reduced by flushing after each milking. Both manure and dissolved pollutants are subsequently carried by the flush water into the liquid manure handling system for further treatment.

Cow Housing (Permit Unit N-8441-2):

The milk cows at the facility will be housed in freestall barns, while the remaining dry cows and support stock will be housed in shade barns. The calves are housed in aboveground hutches. Four of the practices that will be utilized to reduce emissions at the dairy are described below:

² Herd size refers to the total number of cows, whereas profile refers to the specific categories (e.g. lactating, dry, heifer, calf) that constitute the herd.

Freestall Barns

Particulate matter emissions from freestall barns are greatly reduced because the cows will be on a paved surface rather than on dry dirt. Additionally, flushing of the manure lanes creates a moist environment, which further decreases particulate matter emissions.

The only time cows leave their housing is to go to the milking parlor to be milked (twice a day or more depending on the milking schedule). The distance from the freestalls and Saudi-style barn to the milking parlor is insignificant and usually involves walking through a wet process (concrete flush lanes). The only source of PM₁₀ emissions from this type of housing would be generated from the cow bedding.

Shade Structures and Scraping of Corrals/Pens

The support stock and dry cows will be housed in open corrals with concrete lanes and shade structures. Providing shade for the animals reduces movement and unnecessary activity during hot weather, which reduces PM₁₀ emissions.

The surfaces of the freestall exercise pens and open corrals will be scraped in the morning hours on a biweekly basis, except during wet conditions. Frequent scraping of the freestall exercise pens and open corrals will reduce the amount of dry manure on the surfaces that may be pulverized by the cows' hooves and emitted as PM₁₀. This practice will also reduce the chance of anaerobic conditions developing in the manure pack of the freestall exercise pen and corral surface, potentially reducing VOC emissions.

Frequent Flushing

Manure, which is a source of emissions, will be removed from all of the freestall barn and open corral feed lanes and walkways by flushing. Because of ammonia's high affinity for and solubility in water, flushing the lanes and walkways will also reduce volatilization of ammonia from the manure deposited in the corral lanes. The feed lanes and walkways for all mature cows (milk and dry cows) in the freestall barn will be flushed at least three times per day and the feed lanes and walkways for all support stock in the freestall will be flushed at least once per day. Both manure and dissolved pollutants are subsequently carried by the flush water into the liquid manure handling system for further treatment.

Windbreaks

A windbreak, or shelterbelt, is composed of one or more rows of trees and/or shrubs, which are planted in a manner that breaks up wind and reduces the force and speed of wind downwind of the windbreak. Windbreaks can be used to prevent soil erosion, improve air quality by intercepting dust, chemicals, and odors, to protect crops, and to provide habitat for wildlife. An established windbreak upwind of a dairy/feedlot can slow down wind on the downwind side of the windbreak for a distance of 10 times the height of the trees. By reducing the force and speed of the wind, the amount of particulate matter entrained into the atmosphere by the wind will be reduced. A windbreak established downwind of a dairy/feedlot can remove particulate matter by scrubbing the air as wind passes through it.

Windbreak design specifications are provided in the NRCS standard #380. Guidelines from this standard in conjunction with guidelines discussed with the local NRCS office are summarized as follows:

- Windbreak density on the leeward side of the source and windward of the area to be protected should be at least 65%. This density will provide the optimum particulate matter interception. "Density", when viewing through the windbreak from 60 feet to 100 feet away upwind of the rows, is the percentage of the background view that is obscured or hidden.
- Windbreaks should be irrigated to provide the greatest survivability and the most rapid growth of the trees and shrubs.
- Weed control and prompt replacement of any dead trees or shrubs should be practiced.
- Trees and Shrubs that are initially planted as part of a windbreak shall have a minimum container size of five gallons

The applicant has proposed to establish the windbreaks in accordance with the requirements summarized above.

Liquid Manure Handling (Permit Unit N-8441-3):

Settling Basin Separation

The purpose of settling basin separation is to remove the fibrous materials prior to the liquid manure entering the lagoon. By removing the most fibrous material from the liquid stream prior to entering the pond, it is anticipated that the amount of intermediate metabolites released during digestion in the pond may be reduced. Removal of the fibrous material allows for more complete digestion in the pond and lower emissions.

Solids remaining in the settling basin are left to dry and then are removed. The separated solids can be immediately incorporated into cropland or spread in thin layers, harrowed, and dried.

Solids Separation (Mechanical Separator)

The purpose of solids separation is to remove fibrous materials prior to the liquid manure entering the lagoon. By removing the most fibrous material from the liquid stream prior to entering the lagoon, it is anticipated that the amount of intermediate metabolites released during digestion in the lagoon may be reduced. Removal of the fibrous material allows for more complete digestion in the lagoon and lower emissions.

Solids remaining are left to dry and then are removed. The separated solids can be immediately incorporated into cropland or spread in thin layers, harrowed, and dried.

Liquid Manure Land Application

Liquid manure will be applied to cropland at agronomic rates, in compliance with the dairy's comprehensive nutrient management plan and the requirements of the Regional Water Quality Control Board. These practices are expected to reduce odors and result in faster

uptake of nutrients by crops. When applied nutrients are optimally matched with the nutrient needs of developing crops, the excess nutrients that are associated with increased emissions and/or groundwater pollution are minimized.

Mechanically Aerated Lagoons

The modified liquid manure handling system at Manuel Oliveira Dairy will include three mechanically aerated lagoons. The use of mechanically aerated lagoons facilitates the decomposition of wastewater by microbes in the presence of oxygen (O₂) or aerobic decomposition. Aerobic decomposition will reduce VOCs, H₂S, and NH₃ emissions from liquid waste.

Solid Manure Handling (N-8441-4):

Based on the information currently available, emissions from solid manure applied to cropland are expected to be low. However, to ensure that any possible emissions are minimized, the manure will be promptly incorporated into the soil after application. This will reduce any volatilization of gaseous pollutants, as the soil provides cover from wind and other weather elements that enhance volatilization. In addition, incorporation reduces emissions by biofilter effect, whereby the adsorption of NH₃, VOC, and other compounds onto soil particles provides an opportunity for oxidation by the action of various microorganisms in the soil.³

Feed Storage and Handling (N-8441-5):

All cows will be fed in accordance with National Research Council (NRC) guidelines using routine nutritional analysis for rations. NRC guidelines are intended to optimize nutrient uptake by the cow, which not only increases feed efficiency but also minimizes the excretion of undigested protein and other nutrients in the manure. Since excess manure nutrients are the feedstock for the processes that result in NH₃, H₂S and VOC emissions as manure decomposes, the reduction of nutrients in the manure is expected to reduce the emission of these pollutants.

In addition, any refused feed will be removed from the feed lanes on a regular basis to minimize gaseous emissions from decomposition. Silage piles will be covered with plastic tarps to minimize volatilization of pollutants from the pile surfaces.

District Rule 4570 Mitigation Measures

The facility currently complies with all applicable Phase II mitigation measure requirements of District Rule 4570, as previously processed under District projects N-1104400. All mitigation measures result in VOC and ammonia emissions for each permit unit at the dairy. A complete list of the mitigation measures practiced at the facility, and the expected control efficiency for each, is included with the emission calculations shown in Appendix D.

³ Page 9-38 of U.S. EPA's draft document entitled "Emissions From Animal Feeding Operations" (<http://www.epa.gov/ttn/chief/ap42/ch09/draft/draftanimalfeed.pdf>)

VII. General Calculations

A. Assumptions

- Potential to emit calculations will be based on the permitted limits for the different age categories of cows in the proposed herd.
- Only non-fugitive emissions are considered when determining major source status. For this facility, the lagoon/storage pond (Permit Unit N-8441-3) and the emergency standby IC engine (Permit Unit N-8441-6) are the only sources of non-fugitive emissions.
- All PM₁₀ emissions will be allocated to the cow housing permit unit (Permit Unit N-8441-2).
- All H₂S emissions will be allocated to the liquid manure permit unit - lagoon/storage pond (Permit Unit N-8441-3); and will be assumed to be equivalent to 10% of the NH₃ emissions from the lagoon/storage pond.
- The PM₁₀ control efficiency for shade structures is from a District document titled "Dairy/Feedlot PM₁₀ Mitigation Practices and their Control Efficiencies."⁴
- The PM₁₀ emission factors are from a District document titled "Dairy and Feedlot PM₁₀ Emissions Factors,"⁵ which compiled data from studies performed by Texas A&M and ASAE, and a USDA/UC Davis report, quantifying dairy and feedlot emissions.
- The VOC emission factors for milk cows are from a District document titled "Air Pollution Control Officer's Revision to the Dairy VOC Emission Factors, February 2012."⁶ Volatile solids excretion ratios were used to derive the proportionate VOC emission factors for dry cows and support stock.
- The NH₃ emission factor for milk cows is based on California Air Resources Board's dairy cattle ammonia emission factor.⁷ Manure-based VOC emission ratios were used to apportion the NH₃ emission factor to the various emissions units. Further, nitrogen excretion ratios were used to derive the proportionate NH₃ emission factors for dry cows and support stock.
- All the mitigation measures evaluated are expected to result in VOC emission reductions. Where a specific control efficiency has not been determined, a conservative 10% control efficiency will be assumed, unless noted otherwise.

⁴ http://www.valleyair.org/busind/pto/dpag/Dairy_PM10_Control_Efficiencies.pdf

⁵ http://www.valleyair.org/busind/pto/dpag/FYI_%20Dairy_Feedlot_PM10_Emission_Factor.pdf

⁶ [http://www.valleyair.org/busind/pto/emission_factors/2012-Final-Dairy-EE-Report/FinalDairyEFReport\(2-23-12\).pdf](http://www.valleyair.org/busind/pto/emission_factors/2012-Final-Dairy-EE-Report/FinalDairyEFReport(2-23-12).pdf)

⁷ <http://www.arb.ca.gov/ei/areasrc/livestockemisfwp.pdf>

- Mechanically aerated lagoon waste liquid treatment system has the potential to significantly reduce VOC emissions. Although significant VOC emission reductions are expected, a conservative control efficiency of 40% will be applied to this mitigation measure for both storage and land application of liquid manure.

To streamline emission calculations, PM_{2.5} emissions are assumed to be equal to PM₁₀ emissions. Only if needed to determine if a project is a Federal major modification for PM_{2.5} will specific PM_{2.5} emission calculations be performed.

B. Emission Factors

Detailed emission factors (EFs) are listed in the emissions calculation spreadsheet in Appendix D of the sheet titled "EFs".

C. Calculations

1. Pre-Project Potential to Emit (PE1)

Pre-Project Potential to Emit (PE1) for the dairy are calculated based on the maximum design capacity for each type of cow and the pre-project emission control practices in use at the dairy.

Emission calculations for this project are included in the dairy emissions calculation spreadsheet in Appendix D. PE1 for each dairy permit modified under this project are shown in the table below.

Daily Pre-Project Potential to Emit (PE1) (lb/day)							
Permit Number	NO _x	SO _x	PM ₁₀	CO	VOC	NH ₃	H ₂ S
N-8441-1-0	0.0	0.0	0.0	0.0	1.0	0.3	0.0
N-8441-2-0	0.0	0.0	21.7	0.0	33.8	75.2	0.0
N-8441-3-1	0.0	0.0	0.0	0.0	8.9	23.8	0.9
N-8441-4-0	0.0	0.0	0.0	0.0	1.8	9.0	0.0
N-8441-5-0	0.0	0.0	0.0	0.0	65.5	0.0	0.0
Annual Pre-Project Potential to Emit (PE1) (lb/year)							
Permit Number	NO _x	SO _x	PM ₁₀	CO	VOC	NH ₃	H ₂ S
N-8441-1-0	0	0	0	0	382	124	0
N-8441-2-0	0	0	7,934	0	12,330	27,452	0
N-8441-3-1	0	0	0	0	3,211	8,735	348
N-8441-4-0	0	0	0	0	644	3,261	0
N-8441-5-0	0	0	0	0	23,921	0	0

2. Post-Project Potential to Emit (PE2)

The PE2 is based on the maximum permitted capacity for each age category of cows and the controls required and proposed by the applicant. All the emission calculations are included in Appendix D. A summary of the PE2 is shown in the following table:

Daily Post-Project Potential to Emit (PE2) (lb/day)							
Permit Number	NO _x	SO _x	PM ₁₀	CO	VOC	NH ₃	H ₂ S
N-8441-1-1	0.0	0.0	0.0	0.0	2.7	0.9	0.0
N-8441-2-1	0.0	0.0	20.0	0.0	83.0	192.0	0.0
N-8441-3-2	0.0	0.0	0.0	0.0	12.2	39.5	0.9
N-8441-4-1	0.0	0.0	0.0	0.0	3.0	22.8	0.0
N-8441-5-1	0.0	0.0	0.0	0.0	118.8	0.0	0.0
Annual Post-Project Potential to Emit (PE2) (lb/year)							
Permit Number	NO _x	SO _x	PM ₁₀	CO	VOC	NH ₃	H ₂ S
N-8441-1-1	0	0	0	0	1,000	342	0
N-8441-2-1	0	0	7,176	0	30,337	70,216	0
N-8441-3-2	0	0	0	0	4,480	14,416	348
N-8441-4-1	0	0	0	0	1,079	8,322	0
N-8441-5-1	0	0	0	0	43,374	0	0

3. Pre-Project Stationary Source Potential to Emit (SSPE1)

Pursuant to District Rule 2201, the SSPE1 is the Potential to Emit (PE) from all units with valid Authorities to Construct (ATC) or Permits to Operate (PTO) at the Stationary Source and the quantity of Emission Reduction Credits (ERC) which have been banked since September 19, 1991 for Actual Emissions Reductions (AER) that have occurred at the source, and which have not been used on-site.

Pre-Project Stationary Source Potential to Emit (SSPE1) (lb/year)							
Permit Number	NO _x	SO _x	PM ₁₀	CO	VOC	NH ₃	H ₂ S
N-8441-1-0	0	0	0	0	382	124	0
N-8441-2-0	0	0	7,934	0	12,330	27,452	0
N-8441-3-1	0	0	0	0	3,211	8,735	348
N-8441-4-0	0	0	0	0	644	3,261	0
N-8441-5-0	0	0	0	0	23,921	0	0
N-8441-6-0 ⁽⁸⁾	180	0	6	100	9	0	0
SSPE1	180	0	7,940	100	40,497	39,572	348

⁸ Annual PE1 for this permit unit for an emergency standby IC engine was obtained from project #N-1182799.

4. Post-Project Stationary Source Potential to Emit (SSPE2)

Pursuant to District Rule 2201, the SSPE2 is the PE from all units with valid ATCs or PTOs at the Stationary Source and the quantity of ERCs which have been banked since September 19, 1991 for AER that have occurred at the source, and which have not been used on-site.

Post-Project Stationary Source Potential to Emit (SSPE2) (lb/year)							
Permit Number	NO _x	SO _x	PM ₁₀	CO	VOC	NH ₃	H ₂ S
N-8441-1-0	0	0	0	0	1,000	342	0
N-8441-2-0	0	0	7,176	0	30,337	70,216	0
N-8441-3-1	0	0	0	0	4,480	14,416	348
N-8441-4-0	0	0	0	0	1,079	8,322	0
N-8441-5-0	0	0	0	0	43,374	0	0
N-8441-6-0	180	0	6	100	9	0	0
SSPE2	180	0	7,182	100	80,279	93,296	348

5. Major Source Determination

Rule 2201 Major Source Determination:

Pursuant to District Rule 2201, a Major Source is a stationary source with a SSPE2 equal to or exceeding one or more of the following threshold values. For the purposes of determining major source status the following shall not be included:

- any ERCs associated with the stationary source
- Emissions from non-road IC engines (i.e. IC engines at a particular site at the facility for less than 12 months)
- Fugitive emissions, except for the specific source categories specified in 40 CFR 51.165

Agricultural operations do not belong to any of the source categories specified in 40 CFR 51.165. Since the proposed facility is an agricultural operation, fugitive emissions shall not be included in determining whether it will be a major stationary source.

40 CFR 71.2 defines fugitive emissions as “those emissions which could not reasonably pass through a stack, chimney, vent, or other functionally-equivalent opening.” In 2005, the California Air Pollution Control Officers Association (CAPCOA) issued guidance for estimating VOC emissions from dairy farms. This guidance determined that VOC emissions from the milking centers, cow housing areas, corrals, common manure storage areas, and land application of manure are considered fugitive since they are not physically contained and could not reasonably pass through a stack, chimney, vent, or other functionally-equivalent opening. The guidance also determined that VOC emissions from liquid manure lagoons and storage ponds are not considered fugitive because emission collection technologies for liquid manure systems exist. The District has researched this issue and concurs with the CAPCOA determinations, as discussed in more detail below:

Milking Parlor

The mechanical ventilation system could arguably be utilized to capture emissions from the milking parlor. In order achieve and maintain the negative pressure required for this purpose, the adjoining holding area would also need to be completely enclosed. However, enclosing the holding area is not practical due to the continuous movement of cows in and out of the barn throughout the day. In addition, the capital outlay required to enclose this large area would be prohibitive. The District therefore determines that emissions from the milking parlor cannot reasonably be captured, and are to be considered fugitive.

Cow Housing

Although there are smaller dairy farms that have enclosed housing barns, such barns are usually not fully enclosed and do not include any systems for the collection of emissions. In addition, the airflow requirements for dairy cows are extremely high, primarily for herd health reasons. Airflow requirements are expected to be even higher in places such as the San Joaquin Valley, where daytime temperatures can exceed 110 degrees Fahrenheit for prolonged periods during the summer months. Given the high air flow rates that will be involved, collection and control of the exhaust from housing barns is not only impractical but also cost prohibitive. The District therefore determines that emissions from housing barns cannot reasonably be captured, and are to be considered fugitive.

Manure Storage Areas

Solid manure is typically stored in the housing areas, as mounds or piles in individual corrals or pens. Some manure may also be stored in piles outside the housing areas while awaiting land application, shipment offsite, or other uses. Thus, manure storage areas are widely distributed over the dairy site, making it impractical to capture emissions from any significant proportion of the solid manure. The District therefore determines that emissions from manure storage areas cannot reasonably be captured, and are to be considered fugitive.

Land Application

Since manure has to be applied over large expanses of cropland (hundreds or even thousands of acres), there is no practical method that can be used to capture the associated emissions. The District therefore determines that emissions from land application of manure cannot reasonably be captured, and are to be considered fugitive.

Feed Storage and Handling

Silage and total mixed rations (TMR) are the primary sources of emissions from feed storage and handling.

Silage is stored in silage piles. Only two piles will be actively used at any given time and the remainder of the piles will remain covered. One end/face of the silage pile that is actively being used to prepare feed rations must remain open to allow extraction of the silage. A front-end loader is used to extract silage from the open face of the pile throughout the day as the feed rations for the various groups or categories of cows are prepared. A significant proportion of silage pile emissions are associated with this open face, which is exposed to the atmosphere and frequently disturbed during silage extraction. Due to the need to access the pile's open face throughout the day, it is not practical to enclose it or equip it with any kind of device or system that could be used to capture of emissions.

TMR is prepared by mixing silage with various additives such as seeds, grains, and molasses. Because the quality of silage degrades fairly rapidly upon exposure to air, TMR is prepared only when needed and promptly distributed to the feed lanes for consumption. Most of the TMR emissions are thus emitted from the feed lanes, which are located inside the housing barns, where the TMR will remain exposed to the air for at least several hours as the cows feed. As previously discussed, collection and control of emissions from housing barns is not only impractical but also cost prohibitive.

The District therefore determines that emissions from feed handling and storage cannot be reasonably be captured, and are to be considered fugitive.

Therefore, the VOC emissions from these sources are considered fugitive. The District has determined that control technology to capture emissions from lagoons (biogas collection systems, for instance) is in use and these emissions can be reasonably collected and are not fugitive. Therefore, only emissions from the lagoons/storage ponds, and IC engine will be used to determine if this facility is a major source.

Non-Fugitive SSPE1 (lb/year)					
Permit Number	NO_x	SO_x	PM₁₀	CO	VOC
N-8441-3-1 (Lagoons and Storage Ponds only)	0	0	0	0	1,543 ⁹
N-8441-6-0 (IC Engine)	180	0	6	100	9
Non-Fugitive SSPE1	180	0	6	100	1,552

Non-Fugitive SSPE2 (lb/year)					
Permit Number	NO_x	SO_x	PM₁₀	CO	VOC
N-8441-3-2 (Lagoons and Storage Ponds only)	0	0	0	0	2,147 ¹⁰
N-8441-6-0 (IC Engine)	180	0	6	100	9
Non-Fugitive SSPE2	180	0	6	100	2,156

⁹ From Appendix D – In sheet titled “PE1” (Pre-Project Potential to Emit) for Major Source Emissions.

¹⁰ From Appendix D - 'In sheet titled “PE2” (Post-Project Potential to Emit) for Major Source Emissions.

The Rule 2201 major source determination is summarized in the following table:

Rule 2201 Major Source Determination (lb/year)						
	NO_x	SO_x	PM₁₀	PM_{2.5}	CO	VOC
SSPE1	180	0	6	6	100	1,552
SSPE2	180	0	6	6	100	2,156
Major Source Threshold	20,000	140,000	140,000	200,000	200,000	20,000
Major Source?	No	No	No	No	No	No

Note: PM_{2.5} assumed to be equal to PM₁₀

As seen in the table above, the facility is not an existing Major Source and is not becoming a Major Source as a result of this project.

Rule 2410 Major Source Determination:

The facility or the equipment evaluated under this project is not listed as one of the categories specified in 40 CFR 52.21 (b)(1)(iii). Therefore the PSD Major Source threshold is 250 tpy for any regulated NSR pollutant.

Fugitive emissions at dairies are excluded in determining if a source is a major source for PSD. For this dairy, only emissions from the lagoon and IC engine are non-fugitive emissions. Emissions from all other sources are considered fugitive and are excluded from PSD calculations.

PSD Major Source Determination (tons/year)						
	NO₂	VOC	SO₂	CO	PM	PM₁₀
Estimated Facility PE before Project Increase	0.09	0.78	0.0	0.05	0.003	0.003
PSD Major Source Thresholds	250	250	250	250	250	250
PSD Major Source ?	No	No	No	No	No	No

As shown above, the facility is not an existing PSD major source for any regulated NSR pollutant expected to be emitted at this facility.

6. Baseline Emissions (BE)

The BE calculation (in lb/year) is performed pollutant-by-pollutant for each unit within the project to calculate the QNEC, and if applicable, to determine the amount of offsets required.

Pursuant to District Rule 2201, BE = PE1 for:

- Any unit located at a non-Major Source,
- Any Highly-Utilized Emissions Unit, located at a Major Source,
- Any Fully-Offset Emissions Unit, located at a Major Source, or
- Any Clean Emissions Unit, located at a Major Source.

otherwise,

BE = Historic Actual Emissions (HAE), calculated pursuant to District Rule 2201.

As shown in Section VII.C.5 above, the facility is not a Major Source for any pollutant.

Therefore BE = PE1.

7. SB 288 Major Modification

SB 288 Major Modification is defined in 40 CFR Part 51.165 as "any physical change in or change in the method of operation of a major stationary source that would result in a significant net emissions increase of any pollutant subject to regulation under the Act."

Since this facility is not a major source for any of the pollutants addressed in this project, this project does not constitute an SB 288 major modification.

8. Federal Major Modification

District Rule 2201 states that a Federal Major Modification is the same as a "Major Modification" as defined in 40 CFR 51.165 and part D of Title I of the CAA.

Since this facility is not a Major Source for any pollutants, this project does not constitute a Federal Major Modification.

9. Rule 2410 – Prevention of Significant Deterioration (PSD) Applicability Determination

Rule 2410 applies to any pollutant regulated under the Clean Air Act, except those for which the District has been classified nonattainment. The pollutants which must be addressed in the PSD applicability determination for sources located in the SJV and which are emitted in this project are: (See 52.21 (b) (23) definition of significant)

- PM
- PM₁₀
- Hydrogen sulfide (H₂S)
- Total reduced sulfur (including H₂S)

Project Emissions Increase - New Major Source Determination

The post-project potentials to emit from all new and modified units are compared to the PSD major source thresholds to determine if the project constitutes a new major source subject to PSD requirements.

The facility or the equipment evaluated under this project is not listed as one of the categories specified in 40 CFR 52.21 (b)(1)(i). The PSD Major Source threshold is 250 tpy for any regulated NSR pollutant.

The facility or the equipment evaluated under this project is not listed as one of the categories specified in 40 CFR 52.21 (b)(1)(i). The PSD Major Source threshold is 250 tpy for any regulated NSR pollutant.

The non-fugitive stationary source emissions from Section VII.C.5 have been converted into tons. The PSD applicability determination is summarized in the following table:

PSD Major Source Determination: Potential to Emit (tons/year)				
Category	PM	PM₁₀	H₂S	S
Total PE from new and modified units	0	0	0.17	0.17
PSD major source threshold	250	250	250	250
New PSD major source?	No	No	No	No

As shown in the table above, the PE for the proposed project, by itself, does not exceed any PSD major source threshold. Rule 2410 is therefore not applicable and no further analysis is required.

10. Quarterly Net Emissions Change (QNEC)

The QNEC is calculated solely to establish emissions that are used to complete the District's PAS emissions profile screen. Detailed QNEC calculations are included in Appendix I.

VIII. Compliance Determination

Rule 1070 Inspections

This rule allows the District to perform inspections for the purpose of obtaining information necessary to determine whether air pollution sources are in compliance with applicable rules and regulations. The rule also allows the District to require recordkeeping, to make inspections and to conduct tests of air pollution sources. The following conditions will be listed on each permit to ensure compliance:

- *{3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]*
- *{3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]*

Rule 2010 Permits Required

The provisions of this rule apply to any person who plans to or does operate, construct, alter, or replace any source operation, which may emit air contaminants or may reduce the emission of air contaminants.

Pursuant to Section 4.0, a written permit shall be obtained from the APCO. No Permit to Operate shall be granted either by the APCO or the Hearing Board for any source operation described in Section 3.0 constructed or installed without authorization as required by Section 3.0 until the information required is presented to the APCO and such source operation is altered, if necessary, and made to conform to the standards set forth in Rule 2070 (Standards for Granting Applications) and elsewhere in these rules and regulations.

The facility has obtained all required Air District permits and complies with the requirements of this rule.

Rule 2201 New and Modified Stationary Source Review Rule

A. Best Available Control Technology (BACT)

1. BACT Applicability

Pursuant to District Rule 2201, Section 4.1, BACT requirements are triggered on a pollutant-by-pollutant basis and on an emissions unit-by-emissions unit basis. Unless specifically exempted by Rule 2201, BACT shall be required for the following actions*:

- a. Any new emissions unit with a potential to emit exceeding two pounds per day,
- b. The relocation from one Stationary Source to another of an existing emissions unit with a potential to emit exceeding two pounds per day,
- c. Modifications to an existing emissions unit with a valid Permit to Operate resulting in an Adjusted Increase in Permitted Emissions (AIPE) exceeding two pounds per day, and/or
- d. Any new or modified emissions unit, in a stationary source project, which results in an SB 288 Major Modification or a Federal Major Modification, as defined by the rule.

*Except for CO emissions from a new or modified emissions unit at a Stationary Source with an SSPE2 of less than 200,000 pounds per year of CO.

a. New emissions units – PE > 2 lb/day

The applicant is proposing to expand the herd size and add two new freestall barns and aboveground calf hutches. As shown in the calculations in Appendix E, the PE for the new barns and calf hutches exceeds 2 lb/day for PM₁₀, VOC, and NH₃. BACT for new emissions units with PE > 2 lb/day is therefore triggered, as summarized below:

N-8441-2-1 (Cow Housing):

Freestall Barns 5 and 6, and Calf Hutches: VOC, NH₃, and PM₁₀

b. Relocation of emissions units – PE > 2 lb/day

As discussed in Section I above, there are no emissions units being relocated from one stationary source to another; therefore BACT is not triggered.

c. Modification of emissions units – AIPE > 2 lb/day

$$\text{AIPE} = \text{PE2} - \text{HAPE}$$

Where, AIPE = Adjusted Increase in Permitted Emissions (lb/day)
PE2 = The emissions units post project potential to emit (lb/day)
HAPE = The emissions units Historically Adjusted Potential to Emit (lb/day)

$$\text{HAPE} = \text{PE1} \times (\text{EF2} / \text{EF1})$$

Where, PE1 = The emission unit's Potential to Emit prior to modification.
EF2 = The emission unit's permitted emission factor for the pollutant after modification. If EF2 is greater than EF1 then EF2/EF1 shall be set equal to 1.
EF1 = The emission unit's permitted emission factor for the pollutant before the modification.

$$\text{AIPE} = \text{PE2} - (\text{PE1} \times (\text{EF2} / \text{EF1}))$$

The applicant is proposing to expand the herd size and install two shaded barns over existing corrals. Detailed AIPE calculations for each emissions unit are shown in Appendix E. The AIPE is greater than 2 lb/day, and therefore BACT is triggered, for the emission units and each respective pollutants summarized below:

N-8441-2-1 (Cow Housing):

Freestall Barn 3: NH₃

Shade Barn 1: VOC and NH₃

Shade Barn 2: VOC, NH₃, and PM₁₀

N-8441-3-2 (Liquid Manure Handling):

Lagoon/Storage Ponds: VOC and NH₃

Liquid Manure Land Application: VOC and NH₃

N-8441-4-1 (Solid Manure Handling):

Solid Manure Storage: NH₃

Solid Manure Land Application: NH₃

N-8441-5-1 (Feed Storage and Handling):

Total Mixed Ration (TMR): VOC

d. SB 288/Federal Major Modification

As discussed in Sections VII.C.7 and VII.C.8 above, this project does not constitute an SB 288 and/or Federal Major Modification for any pollutant. Therefore BACT is not triggered for any pollutant.

2. BACT Guideline

The following BACT Guidelines applies to the dairy emission units triggering BACT as stated above:

- District BACT Guideline 5.8.2 (Cow Housing – Freestall and Saudi-Style Barns)

- District BACT Guideline 5.8.4 (Cow Housing – Loafing Barns)
- District BACT Guideline 5.8.5 (Cow Housing – Area for Baby Calves (0-3 months))
- District BACT Guideline 5.8.6 (Liquid Manure Handling – Lagoon/Storage Ponds)
- District BACT Guideline 5.8.7 (Liquid Manure Handling – Liquid/Slurry Land Application)
- District BACT Guideline 5.8.8 (Solid Manure Handling – Storage/Separated Solid Piles)
- District BACT Guideline 5.8.9 (Solid Manure Handling – Land Application)
- District BACT Guideline 5.8.11 (Feed Storage and Handling – Feed/TMR)

3. Top-Down BACT Analysis

Per Permit Services Policies and Procedures for BACT, a Top-Down BACT analysis shall be performed as a part of the application review for each application subject to the BACT requirements pursuant to the District's NSR Rule.

Pursuant to the attached Top-Down BACT Analysis in Appendix G of this document, BACT has been satisfied with the following:

N-8441-2-1 (Cow Housing):

VOC (Freestall Barns 5 and 6):

- (1). Concrete feed lanes and walkways;
- (2). Flushing the feed lanes and walkways for the mature cows (milk and dry cows) four times per day and flushing feed lanes and walkways for the remaining animals once per day (or for dairies that cannot use a flush system, scraping feed lanes and walkways for mature cows with an automatic scraper (or equivalent) four times per day and cleaning feed lanes and walkways for support stock (heifers) at least once per day);
- (3). Feeding all animals in accordance with National Research Council (NRC) or other District-approved guidelines;
- (4). Properly sloping corrals (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal) or managing corrals to maintain a dry surface;
- (5). Scraping corrals and exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions; and
- (6). District Rule 4570 Mitigation Measures.

NH₃ (Freestall Barns 3, 5, and 6):

- (1). Concrete feed lanes and walkways;
- (2). Flushing the feed lanes and walkways for the mature cows (milk and dry cows) four times per day and flushing feed lanes and walkways for the remaining animals once per day (or for dairies that cannot use a flush system, scraping feed lanes and walkways for mature cows with an automatic scraper (or equivalent) four times per day and cleaning feed lanes and walkways for support stock (heifers) at least once per day);

- (3). Feeding all animals in accordance with National Research Council (NRC) or other District-approved guidelines;
- (4). Properly sloping corrals (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal) or managing corrals to maintain a dry surface; and
- (5). Scraping corrals and exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions.

PM₁₀ (Freestall Barns 5 and 6):

- (1). Concrete feed lanes and walkways; and
- (2). Scraping exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions;

VOC (Shade Barns 1 and 2):

- (1). Concrete feed lanes and walkways;
- (2). Flushing the feed lanes and walkways for the mature cows (milk and dry cows) four times per day and flushing feed lanes and walkways for the remaining animals once per day (or for dairies that cannot use a flush system, scraping feed lanes and walkways for mature cows with an automatic scraper (or equivalent) four times per day and cleaning feed lanes and walkways for support stock (heifers) at least once per day);
- (3). Feeding all animals in accordance with National Research Council (NRC) or other District-approved guidelines;
- (4). Properly sloping corrals (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal) or managing corrals to maintain a dry surface;
- (5). Scraping corrals and exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions; and
- (6). District Rule 4570 Mitigation Measures.

NH₃ (Shade Barns 1 and 2):

- (1). Concrete feed lanes and walkways;
- (2). Flushing the feed lanes and walkways for the mature cows (milk and dry cows) four times per day and flushing feed lanes and walkways for the remaining animals once per day (or for dairies that cannot use a flush system, scraping feed lanes and walkways for mature cows with an automatic scraper (or equivalent) four times per day and cleaning feed lanes and walkways for support stock (heifers) at least once per day);
- (3). Feeding all animals in accordance with National Research Council (NRC) or other District-approved guidelines;
- (4). Properly sloping corrals (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal) or managing corrals to maintain a dry surface; and
- (5). Scraping corrals and exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions.

PM₁₀ (Shade Barn 2):

- (1). Concrete feed lanes and walkways;
- (2). Scraping exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions;
- (3). Windbreaks controlling dust from corrals (when feasible, supported by soil conditions, and there is adequate space at existing facilities).

VOC and NH₃ (New Calf Hutches):

- (1). Flushing or scraping to remove manure from the cow housing areas for the baby calves at least once per week; and
- (2). Feeding baby dairy calves in accordance with National Research Council (NRC) or other District-approved guidelines.

PM₁₀ (New Calf Hutches):

- (1). Use of Calf Hutches.

N-8441-3-2 (Liquid Manure Handling):

VOC (Lagoon/Storage Ponds):

- (1). Use of mechanically aerated lagoons.

VOC (Land Application):

- (1). Irrigation of crops using liquid/slurry manure from mechanically aerated lagoons.

NH₃ (Lagoon/Storage Ponds and Land Application):

- (1). All animals fed in accordance with Natural Resources Conservation Services (NRCS) or other District-approved guidelines.

N-8441-4-1 (Solid Manure Handling):

NH₃ (Solid Manure Storage):

- (1). All animals fed in accordance with Natural Resources Conservation Services (NRCS) or other District-approved guidelines.

NH₃ (Solid Manure Land Application):

- (1). Rapid incorporation of solid manure into the soil after land application, and all animals fed in accordance with Natural Resources Conservation Services (NRCS) or other District-approved guidelines.

N-8441-5-1 (Feed Storage and Handling):

VOC (Total Mixed Rations):

- (1). District Rule 4570 mitigation measures for feed/TMR.

B. Offsets

1. Offset Applicability

Pursuant to District Rule 2201, Section 4.5, offset requirements shall be triggered on a pollutant by pollutant basis and shall be required if the SSPE2 equals or exceeds the offset threshold levels in Table 4-1 of Rule 2201.

The SSPE2 is compared to the offset thresholds in the table below.

Offset Determination (lb/year)					
	NO _x	SO _x	PM ₁₀	CO	VOC
SSPE2	180	0	7,182	100	80,279
Offset Thresholds	20,000	54,750	29,200	200,000	20,000
Offsets triggered?	No	No	No	No	Yes

2. Quantity of Offsets Required

As seen above, the SSPE2 is greater than the offset thresholds only for VOC emissions. However, per Section 4.6.9, offsets are not required for agricultural sources unless they are a major source. As determined in Section VII.C.5 above, this facility is not a major source for any pollutant; therefore, offset calculations are not necessary and offsets will not be required for this project.

C. Public Notification

1. Applicability

Pursuant to District Rule 2201, Section 5.4, public noticing is required for:

- New Major Sources, Federal Major Modifications, and SB 288 Major Modifications,
- Any new emissions unit with a Potential to Emit greater than 100 pounds during any one day for any one pollutant,
- Any project which results in the offset thresholds being surpassed,
- Any project with an SSIPE of greater than 20,000 lb/year for any pollutant, and/or
- Any project which results in a Title V significant permit modification

a. New Major Sources, Federal Major Modifications, and SB 288 Major Modifications

New Major Sources are new facilities, which are also Major Sources. Since this is not a new facility, public noticing is not required for this project for New Major Source purposes.

As demonstrated in Sections VII.C.7 and VII.C.8, this project does not constitute an SB 288 or Federal Major Modification; therefore, public noticing for SB 288 or Federal Major Modification purposes is not required.

b. PE > 100 lb/day

Applications which include a new emissions unit with a PE greater than 100 pounds during any one day for any pollutant will trigger public noticing requirements. The facility is proposing to construct two new freestall barns, two shade barns over existing corrals, and aboveground calf hutches. As shown in the cow housing calculations in Appendix D, the new emission units do not have a Potential to Emit greater than 100 lb/day for any pollutant; therefore, public noticing for PE > 100 lb/day purposes is not required.

c. Offset Threshold

Public notification is required if the pre-project Stationary Source Potential to Emit (SSPE1) is increased to a level exceeding the offset threshold levels. The following table compares the SSPE1 with the SSPE2 in order to determine if any offset thresholds have been surpassed with this project.

Offset Thresholds				
Pollutant	SSPE1 (lb/year)	SSPE2 (lb/year)	Offset Threshold	Public Notice Required?
NO _x	180	180	20,000 lb/year	No
SO _x	0	0	54,750 lb/year	No
PM ₁₀	7,940	7,182	29,200 lb/year	No
CO	100	100	200,000 lb/year	No
VOC	40,497	80,279	20,000 lb/year	No

As demonstrated above, the SSPE1 is above the offset threshold for VOC prior to this project. There were no thresholds surpassed with this project; therefore public noticing is not required for offset purposes.

d. SSPIE > 20,000 lb/year

Public notification is required for any permitting action that results in a SSPIE of more than 20,000 lb/year of any affected pollutant. According to District policy, the SSPIE = SSPE2 – SSPE1. The SSPIE is compared to the SSPIE Public Notice thresholds in the following table.

SSIPE Public Notice Thresholds					
Pollutant	SSPE2 (lb/year)	SSPE1 (lb/year)	SSIPE (lb/year)	SSIPE Public Notice Threshold	Public Notice Required?
NO _x	180	180	0	20,000 lb/year	No
SO _x	0	0	0	20,000 lb/year	No
PM ₁₀	7,182	7,940	-758	20,000 lb/year	No
CO	100	100	0	20,000 lb/year	No
VOC	80,279	40,497	39,782	20,000 lb/year	Yes
NH ₃	93,296	39,572	53,724	20,000 lb/year	Yes
H ₂ S	348	348	0	20,000 lb/year	No

As demonstrated above, the SSIPEs for VOC and NH₃ are greater than 20,000 lb/year; therefore public noticing for SSIPE purposes is required.

e. Title V Significant Permit Modification

Since this facility does not have a Title V operating permit, this change is not a Title V significant Modification, and therefore public noticing is not required.

2. Public Notice Action

As discussed above, public noticing is required for this project for SSIPE in excess of 20,000 lb/day for VOC and NH₃. Therefore, public notice documents will be submitted to the California Air Resources Board (CARB) and a public notice will be electronically published on the District's website prior to the issuance of the ATC permits for the associated operations.

D. Daily Emission Limits (DELs)

DELs and other enforceable conditions are required by Rule 2201 to restrict a unit's maximum daily emissions, to a level at or below the emissions associated with the maximum design capacity. The DEL must be contained in the latest ATC and contained in or enforced by the latest PTO and enforceable, in a practicable manner, on a daily basis. DELs are also required to enforce the applicability of BACT.

For dairies, the DEL is satisfied based on the number and types of cows at the dairy, and any proposed mitigation measures. The number and types of cows are listed in the permit equipment description for the cow housing permit (N-8441-2-1).

The following District Rule 2201 conditions will be included in the ATC permits to ensure compliance with applicable BACT requirements and/or control efficiencies attributed to mitigation measures implemented at the facility. Some of the following conditions may reference District Rule 4570, as these are mitigation measures the facility has selected to comply with that rule.

Proposed Rule 2201 (DEL) Conditions:

N-8441-1-1 (Cow Milking Operation):

- *{Modified 4484} Permittee shall flush or hose down the milking parlor immediately prior to, immediately after, or during each milking. [District Rules 2201 and 4570]*

N-8441-2-1 (Cow Housing):

- *{Modified 4454} Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rules 2201, 4102, and 4570]*
- *{Modified 4486} Permittee shall pave feed lanes for a width of at least 8 feet along the corral side of the feed lane fence for milk and dry cows and at least 6 feet along the corral side of the feed lane fence for support stock. [District Rules 2201, 4102, and 4570]*
- *{Modified 4487} Permittee shall flush, scrape, or vacuum freestall lanes immediately prior to, immediately after or during each milking. [District Rules 2201, 4102, and 4570]*
- *{Modified 4492} Permittee shall remove manure that is not dry from individual cow freestall beds or shall rake, harrow, scrape, or grade freestall bedding at least once every seven (7) days. [District Rules 2201 and 4570]*
- *{Modified 4499} Permittee shall inspect water pipes and troughs and repair leaks at least once every seven (7) days. [District Rules 2201 and 4570]*
- *{Modified 4501} Permittee shall clean manure from corrals at least four (4) times per year with at least sixty (60) days between cleanings; or permittee shall clean corrals at least once between April and July and at least once between September and December. [District Rules 2201 and 4570]*
- *{Modified 4508} Permittee shall scrape, vacuum or flush concrete lanes in corrals at least once every day for mature cows and every seven (7) days for support stock. [District Rule 2201, 4102, and 4570]*
- *{Modified 4518} Permittee shall manage corrals such that the depth in the corral does not exceed twelve (12) inches at any time or point, except for in-corral mounding. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. However, permittee must resume management of the manure depth of 12 inches or lower immediately upon the corrals becoming accessible. [District Rules 2201 and 4570]*
- *For Freestall Barns 3, 5, and 6, and Shade Barns 1 and 2, the feedlanes and walkways shall be constructed of concrete. [District Rules 2201, 4102, and 4570]*
- *For Freestall Barns 3, 5, and 6, and Shade Barns 1 and 2, the permittee shall flush the feed lanes and walkways for the mature cows (milk and dry cows) at least four times per day and for the support stock (heifers) at least once per day or scrape feed lanes and walkways for mature cows with an automatic scraper (or equivalent) four times per day and for support stock at least once per day. [District Rules 2201, 4102, and 4570]*

- *For the new calf hutches and new calf housing areas, the permittee shall flush or scrape these housing areas at least once every week. [District Rule 2201 and 4570]*
- *Permittee shall scrape exercise pen and corral surfaces every two weeks using a pull-type scraper during morning hours, except when prevented by wet conditions. [District Rules 2201 and 4102]*
- *{Modified 4554} Permittee shall implement at least one of the following corral mitigation measures: 1) slope the surface of the corrals at least 3% where the available space for each animal is 400 square feet or less and shall slope the surface of the corrals at least 1.5% where the available space for each animal is more than 400 square feet per animal; 2) maintain corrals to ensure proper drainage preventing water from standing more than forty-eight hours; or 3) harrow, rake, or scrape pens sufficiently to maintain a dry surface except during periods of rainy weather. [District Rules 2201, 4102 and 4570]*
- *Permittee shall establish a continuous line of windbreaks stretching at least 600 feet along the eastern boundary of Shade Barn 1 housing area and at least 600 feet along the western boundary of Freestall Barn 6 housing area. The eastern boundary windbreaks shall consist of one row of Mule-Fat shrubs spaced 8 feet apart, one row of Fremont Cottonwood trees spaced 10 feet apart, and one row of California Sycamore trees spaced 14 feet apart. The western boundary windbreaks shall consist of one row of Mule-Fat shrubs spaced 8 feet apart and one row of Fremont Cottonwood trees spaced 10 feet apart. Each row should be offset from the adjacent row. Spacing between rows shall be sufficient to accommodate cultivation equipment, but shall not exceed 24 feet. Any alternative windbreak proposal must be approved by the District. [District Rule 2201]*
- *Shrubs/trees that are initially planted as part of the windbreak shall have a minimum container size of five gallons. [District Rule 2201]*
- *Windbreaks shall be irrigated and maintained for survivability and rapid growth. Dead trees and shrubs shall be replaced as necessary to maintain a windbreak density of at least 65% for downwind windbreaks and at least 50% for upwind windbreaks. Windbreak density is the percentage of the background view that is obscured or hidden when viewing through the windbreak from 60 ft to 100 ft upwind of the rows. [District Rule 2201]*

N-8441-3-2 (Liquid Manure Handling):

- *{Modified 4454} Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rules 2201 and 4102]*
- *{Modified 4538} Permittee shall remove solids with a solids separation system prior to the manure entering the lagoon. [District Rules 4102 and 4570]*
- *{4550} Permittee shall not allow liquid manure to stand in the fields for more than twenty-four (24) hours after irrigation. [District Rule 4570]*
- *All liquid manure shall be treated in mechanically aerated treatment lagoons that is designed and operated according to the Natural Resources Conservative Service (NRCS) Field Office Technical Guide No. 359. [District Rules 2201, 4102, and 4570]*

- *Any liquid manure applied to land shall have been treated in mechanically aerated treatment lagoons that is designed and operated according to the NRCS Field Office Technical Guide No. 359. [District Rules 2201, 4102, and 4570]*

N-8441-4-1 (Solid Manure Handling):

- *{Modified 4454} Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rules 2201 and 4570]*
- *{4526} Within seventy-two (72) hours of removal of solid manure from housing, permittee shall either 1) remove dry manure from the facility, or 2) cover dry manure outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed twenty-four (24) hours per event. [District Rule 4570]*
- *{Modified 4541} Solid manure shall be incorporated into the soil within two hours of land application. [District Rules 2201 and 4570]*

N-8441-5-1 (Feed Storage and Handling):

- *{Modified 4454} Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rules 2201 and 4570]*
- *{Modified 4456} Permittee shall push feed so that it is within three feet of the feed lane fences within two hours of putting out the feed, or use feed troughs or other feeding structures designed to maintain feed within reach of the animals. [District Rules 2201 and 4570]*
- *{Modified 4458} Permittee shall begin feeding total mixed rations within two hours of grinding and mixing rations. [District Rules 2201 and 4570]*
- *{Modified 4460} Permittee shall store grain in a weatherproof storage structure or under a weatherproof covering from October through May. [District Rules 2201 and 4570]*
- *{Modified 4462} Permittee shall feed steam-flaked, dry rolled, cracked or ground corn or other steam-flaked, dry rolled, cracked or ground cereal grains. [District Rules 2201 and 4570]*
- *{Modified 4468} For bagged silage/feedstuff, permittee shall utilize a sealed feed storage system (e.g., ag bag). [District Rules 2201 and 4570]*
- *{Modified 4469} Permittee shall cover all silage piles, except for the area where feed is being removed from the pile, with a plastic tarp that is at least five (5) mils (0.005 inches) thick, multiple plastic tarps with a cumulative thickness of at least 5 mils (0.005 inches), or an oxygen barrier film covered with a UV resistant material. Silage piles shall be covered within seventy-two (72) hours of last delivery of material to the pile. Sheets of material used to cover silage shall overlap so that silage is not exposed where the sheets meet. [District Rules 2201 and 4570]*

- *{Modified 4471} Permittee shall select and implement one of the following mitigation measures for building each silage pile at the facility: Option 1) build the silage pile such that the average bulk density is at least 44 lb/cu ft for corn silage and 40 lb/cu ft for other silage types, as measured in accordance with Section 7.11 of District Rule 4570; Option 2) Adjust filling parameters when creating the silage pile to achieve an average bulk density of at least 44 lb/cu ft for corn silage and at least 40 lb/cu ft for other silage types as determined using a District-approved spreadsheet; or Option 3) build silage piles using crops harvested with the applicable minimum moisture content, maximum Theoretical Length of Chop (TLC), and roller opening identified in District Rule 4570, Table 4.1, 1.d and manage silage material delivery such that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. Records of the option chosen as a mitigation measure for building each silage pile shall be maintained. [District Rules 2201 and 4570]*
- *{Modified 4474} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall harvest corn used for the pile at an average moisture content of at least 65% and harvest other silage crops for the pile at an average moisture content of at least 60%. [District Rules 2201 and 4570]*
- *{Modified 4476} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall adjust setting of equipment used to harvest crops for the pile to incorporate the following parameters for Theoretical Length of Chop (TLC) and roller opening, as applicable: 1) Corn with no processing: TLC not exceeding 1/2 inch, 2) Processed Corn: TLC not exceeding 3/4 inch and roller opening of 1-4 mm, 3) Alfalfa/Grass: TLC not exceeding 1.0 inch, 4) Other silage crops: TLC not exceeding 1/2 inch. [District Rules 2201 and 4570]*
- *{Modified 4478} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall manage silage material delivery such that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. [District Rules 2201 and 4570]*
- *{Modified 4480} Permittee shall select and implement at least two of the following mitigation measures for management of silage piles at the facility: Option 1) manage silage piles such that only one silage pile has an uncovered face and the total exposed surface area is less than 2,150 square feet, or manage multiple uncovered silage piles such that the total exposed surface area of all uncovered silage piles is less than 4,300 square feet; Option 2) use a shaver/facer to remove silage from the silage pile, or shall use another method to maintain a smooth vertical surface on the working face of the silage pile; or Option 3) inoculate silage with homolactic lactic acid bacteria in accordance with manufacturer recommendations to achieve a concentration of at least 100,000 colony forming units per gram of wet forage, apply propionic acid, benzoic acid, sorbic acid, sodium benzoate, or potassium sorbate at the rate specified by the manufacturer to reduce yeast counts when forming silage piles, or apply other additives at rates that have been demonstrated to reduce alcohol concentrations in silage and/or VOC emissions from silage and have been approved by the District and EPA. Records of the options chosen for managing each silage pile shall be maintained. [District Rules 2201 and 4570]*

E. Compliance Assurance

1. Source Testing

Pursuant to District Policy APR 1705, source testing is not required to demonstrate compliance with Rule 2201.

2. Monitoring

No monitoring is required to demonstrate compliance with Rule 2201.

3. Recordkeeping

Recordkeeping is required to demonstrate compliance with the offset, public notification and daily emission limit requirements of Rule 2201. In general, recordkeeping for the Milking Parlor (N-8441-1-1), the Liquid Manure Handling System (N-8441-3-2), and the Solid Manure Handling System (N-8441-4-1) and the Feed Storage and Handling System (N-8441-5-1) is satisfied with the records that must be kept to demonstrate compliance with the numbers and types of cows listed in the permit equipment description for the Cow Housing (N-8441-2-1). Conditions that will be placed on the ATC permits are listed below.

N-8441-1-1 (Cow Milking Operation):

- *{Modified 4485} Permittee shall provide verification that milk parlor is flushed or hosed down immediately prior to, immediately after, or during each milking. [District Rules 2201 and 4570]*
- *{Modified 4453} Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 2201 and 4570]*

N-8441-2-1 (Cow Housing):

- *{Modified 4455} Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rules 2201, 4102, and 4570]*
- *{Modified 4488} Permittee shall maintain records sufficient to demonstrate that freestall lanes are flushed, scraped, or vacuumed immediately prior to, immediately after or during each milking. [District Rules 2201, 4102, and 4570]*
- *{Modified 4493} Permittee shall record either of the following: 1) the dates when manure that is not dry is removed from individual cow freestall beds or 2) the dates when the freestall bedding is raked, harrowed, scraped, or graded. [District Rules 2201 and 4570]*

- *{Modified 4500} Permittee shall maintain records demonstrating that water pipes and troughs are inspected and leaks are repaired at least once every seven (7) days. [District Rules 2201 and 4570]*
- *{Modified 4502} Permittee shall demonstrate that manure from corrals are cleaned at least four (4) times per year with at least sixty (60) days between each cleaning or demonstrate that corrals are cleaned at least once between April and July and at least once between September and December. [District Rules 2201 and 4570]*
- *{Modified 4556} Permittee shall maintain records demonstrating that concrete lanes in corrals are scraped, vacuumed, or flushed at least once every day for mature cows and at least once every seven (7) days for support stock. [District Rules 2201 and 4570]*
- *Permittee shall maintain records demonstrating that the new calf hutches and new calf housing areas are flushed or scraped at least once every week. [District Rules 2201 and 4570]*
- *{Modified 4519} Permittee shall measure and document the depth of manure in the corrals at least once every ninety (90) days. [District Rules 2201 and 4570]*
- *{Modified 4490} For Freestall Barns 3, 5, and 6, and Shade Barns 1 and 2, the permittee shall maintain records or maintain an operating plan that requires feed lanes and walkways for mature cows to be flushed or scraped at least four (4) times per day and the feed lanes and walkways for support stock to be flushed or scraped at least once per day. [District Rules 2201, 4102, and 4570]*
- *Permittee shall maintain sufficient records to demonstrate that exercise pen/corral surfaces are scraped every two weeks using a pull-type scraper during morning hours, except when prevented by wet conditions. [District Rules 2201 and 4102]*
- *{Modified 4555} Permittee shall either 1) maintain sufficient records to demonstrate that corrals and exercise pens are maintained to ensure proper drainage preventing water from standing for more than forty-eight hours and 2) maintain records of dates corrals and exercise pens are groomed (i.e. harrowed, raked, or scraped, etc.). [District Rules 2201 and 4570]*
- *{Modified 4449} Permittee shall maintain a record of the number of animals of each species and production group at the facility and shall maintain quarterly records of any changes to this information. [District Rules 2201 and 4570]*
- *{Modified 4453} Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 2201 and 4570]*

N-8441-3-2 (Liquid Manure Handling):

- *{Modified 4455} Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rules 2201 and 4570]*
- *{4551} Permittee shall maintain records to demonstrate liquid manure did not stand in the fields for more than twenty-four (24) hours after irrigation. [District Rule 4570]*
- *Permittee shall maintain records to demonstrate that only liquid manure that has been treated in mechanically aerated treatment lagoons is applied to the fields. [District Rules 2201, 4102, and 4570]*
- *{Modified 4453} Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 4102 and 4570]*

N-8441-4-1 (Solid Manure Handling):

- *{Modified 4455} Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rules 2201 and 4570]*
- *{4527} Permittee shall keep records of dates when manure is removed from the facility or permittee shall maintain records to demonstrate that dry manure piles outside the pens are covered with a weatherproof covering from October through May. [District Rule 4570]*
- *{4528} If weatherproof coverings are used, permittee shall maintain records, such as manufacturer warranties or other documentation, demonstrating that the weatherproof covering over dry manure are installed, used, and maintained in accordance with manufacturer recommendations and applicable standards listed in NRCS Field Office Technical Guide Code 313 or 367, or any other applicable standard approved by the APCO, ARB, and EPA. [District Rule 4570]*
- *{Modified 4542} Permittee shall maintain records to demonstrate that solid manure has been incorporated into the soil within two hours of land application. [District Rules 2201 and 4570]*
- *{Modified 4453} Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 2201 and 4570]*

N-8441-5-1 (Feed Storage and Handling):

- *{Modified 4455} Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rules 2201 and 4570]*
- *{Modified 4457} Permittee shall maintain an operating plan or record that requires feed to be pushed within three feet of feedlane fence within two hours of putting out the feed, or use of a feed trough or other structure designed to maintain feed within reach of the animals. [District Rules 2201 and 4570]*
- *{Modified 4459} Permittee shall maintain an operating plan or record of when feeding of total mixed rations began within two hours of grinding and mixing rations. [District Rules 2201 and 4570]*
- *{Modified 4461} Permittee shall maintain records demonstrating grain is/was stored in a weatherproof storage structure or under a weatherproof covering from October through May. [District Rules 2201 and 4570]*
- *{Modified 4463} Permittee shall maintain records to demonstrate animals are fed steam-flaked, dry rolled, cracked or ground corn or other steam-flaked, dry rolled, cracked or ground cereal grains. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rules 2201 and 4570]*
- *{4470} Permittee shall maintain records of the thickness and type of cover used to cover each silage pile. Permittee shall also maintain records of the date of the last delivery of material to each silage pile and the date each pile is covered. [District Rules 2201 and 4570]*
- *{Modified 4472} For each silage pile that Option 1 (Measured Bulk Density) is chosen as a mitigation measure for building the pile, records of the measured bulk density shall be maintained. [District Rules 2201 and 4570]*
- *{Modified 4473} For each silage pile that Option 2 (Bulk Density Determined by Spreadsheet) is chosen as a mitigation measure for building the pile, records of the filling parameters entered into the District-approved spreadsheet to determine the bulk density shall be maintained. [District Rules 2201 and 4570]*
- *{Modified 4475} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, records of the average percent moisture of crops harvested for silage shall be maintained. [District Rules 2201 and 4570]*
- *{Modified 4477} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, records that equipment used to harvest crops for the pile was set to the required TLC and roller*

opening for the type of crop harvested shall be maintained. [District Rules 2201 and 4570]

- *{Modified 4479} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall maintain a plan that requires that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. [District Rules 2201 and 4570]*
- *{Modified 4481} If Option 1 (Limiting Exposed Area of Silage) is chosen as a mitigation measure for managing silage piles, the permittee shall calculate and record the maximum (largest part of pile) total exposed area of each silage pile. Records of the maximum calculated area shall be maintained. [District Rules 2201 and 4570]*
- *{Modified 4482} For each silage pile that Option 2 (Shaver/Facer or Smooth Face) is chosen as a mitigation measure for managing the pile, the permittee shall maintain records that a shaver/facer was used to remove silage from the pile or shall visually inspect the pile at least daily to verify that the working face was smooth and maintain records of the visual inspections. [District Rules 2201 and 4570]*
- *{Modified 4483} For each silage pile that Option 3 (Silage Additives) is chosen as a mitigation measure for managing the pile, records shall be maintained of the type additive (e.g. inoculants, preservative, other District & EPA-approved additive), the quantity of the additive applied to the pile, and a copy of the manufacturer's instructions for application of the additive. [District Rules 2201 and 4570]*
- *{Modified 4453} Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 2201 and 4570]*

These permit units are also subject to the recordkeeping requirements of District Rule 4570 (Confined Animal Facilities), which will be discussed under Rule 4570 section below.

4. Reporting

No reporting is required to demonstrate compliance with Rule 2201.

F. Ambient Air Quality Analysis (AAQA)

Section 4.14 of District Rule 2201 requires that an AAQA be conducted for the purpose of determining whether a new or modified Stationary Source will cause or make worse a violation of an air quality standard. The District's Technical Services Division conducted the required analysis. Refer to **Appendix H** of this document for the AAQA summary sheet.

The proposed location is in an attainment area for NO_x, CO, and SO_x. As shown by the AAQA summary sheet the proposed equipment will not cause a violation of an air quality standard for NO_x, CO, or SO_x.

The proposed location is in a non-attainment area for the state's PM₁₀ as well as federal and state PM_{2.5} thresholds. As shown by the AAQA summary sheet the proposed equipment will not cause a violation of an air quality standard for PM₁₀ and PM_{2.5}.

Rule 2410 Prevention of Significant Deterioration

As shown in Section VII.C.9 above, this project does not result in a new PSD major source or PSD major modification. No further discussion is required.

Rule 2520 Federally Mandated Operating Permits

Since this facility's potential emissions do not exceed any major source thresholds of Rule 2201, this facility is not a major source, and Rule 2520 does not apply.

Rule 2550 Federally Mandated Preconstruction Review for Major Sources of Air Toxics

The provisions of this rule only apply to applications to construct or reconstruct a major air toxics source with Authority to Construct issued on or after June 28, 1998.

Newly constructed facilities or reconstructed units or sources at existing facilities are subject to preconstruction review requirements if they have the potential to emit hazardous air pollutants (air toxics) in "major" amounts (10 tons or more of an individual pollutant or 25 tons or more of a combination of pollutants) and the new units are not already subject to a standard promulgated under Section 112(d), 112(j), or 112(h) of the Clean Air Act." Facilities or sources subject to Rule 2550 would be subject to stringent air pollution control requirements, referred to as Maximum Achievable Control Technology (MACT).

The federal Clean Air Act (Section 112(b)(1)) lists 189 substances as potential hazardous air pollutants (HAPs). The following table outlines the HAPs expected to be emitted from dairies, and their estimated emission rates, based on the best data currently available:

Hazardous Air Pollutant Emissions from Dairies		
HAP	Emission Rate lb/milk cow-year	Source
Methanol	1.35	UC Davis - <i>VOC Emission from Dairy Cows and their Excreta</i> , 2005
Carbon disulfide	0.027	Dr. Schmidt - <i>Dairy Emissions using Flux Chambers (Phase I & II)</i> , 2005
Ethylbenzene	0.003	
o-Xylene	0.005	
1,2-Dibromo-3chloropropane	0.011	
1,2,4-Trichlorobenzene	0.025	
Naphthalene	0.012	
Hexachlorobutadiene	0.012	
Formaldehyde	0.005	
Acetaldehyde	0.029	
Chloroform	0.017	California State University Fresno (CSUF) - <i>Monitoring and Modeling of ROG at California Dairies</i> , 2005
Styrene	0.01	

Vinyl acetate ¹¹	0.08	Dr. Schmidt - <i>Dairy Emissions using Flux Chambers (Phase I & II) & California State University Fresno (CSUF) - Monitoring and Modeling of ROG at California Dairies, 2005</i>
Toluene ¹²	0.162	
Cadmium	0.009	Air Resources Board's Profile No. 423, Livestock Operations Dust
Hexavalent Chromium	0.004	
Nickel	0.026	
Arsenic	0.005	
Cobalt	0.003	
Lead	0.033	
Total	1.828	

Since the proposed dairy is subject to Best Available Control Technology (BACT) emissions control requirements and Rule 4570 mitigation measures, many of the pollutants listed above are expected to be controlled significantly. However, in order to ensure that this evaluation is based on the worst-case scenario, no controls will be factored into the HAPs emissions estimates. Please note that a conclusion that MACT requirements are triggered would necessarily involve consideration of controlled emissions levels. Based on the total emission rate shown in the preceding table, the HAPs emissions calculations for the proposed dairy are summarized in the table below:

HAPs Emissions Calculations						
Category	Number of cows		Emission Rate lb/cow-year ¹³		Emissions	
					lb/year	tons/year
Milking Cows	1,630	x	1.828	=	2,980	1.49
Dry Cows	400	x	1.123	=	449	0.22
Support Stock	905	x	0.786	=	711	0.36
Calves (0 - 3 mon)	300	x	0.584	=	175	0.09
Total =					4,315	2.16

As shown above total HAPs emissions are expected to be less than 10 tons per year. The proposed facility will therefore not be a major air toxics source and the provisions of Rule 2550 are not applicable.

Rule 4001 New Source Performance Standards (NSPS)

This rule incorporates NSPS from Part 60, Chapter 1, Title 40, Code of Federal Regulations (CFR); and applies to all new sources of air pollution and modifications of existing sources of air pollution listed in 40 CFR Part 60. However, no subparts of 40 CFR Part 60 apply to [confined animal facilities](#).

¹¹ 0.01 + 0.07 = 0.08 lbs/hd-year.

¹² 0.012 + 0.15 = 0.162 lbs/hd-year.

¹³ The emission rate total has been adjusted for each cow category using ratios based on manure production rates.

Rule 4002 National Emission Standards for Hazardous Air Pollutants (NESHAPs)

This rule incorporates NESHAPs from Part 61, Chapter I, Subchapter C, Title 40, CFR and the NESHAPs from Part 63, Chapter I, Subchapter C, Title 40, CFR; and applies to all sources of hazardous air pollution listed in 40 CFR Part 61 or 40 CFR Part 63. However, no subparts of 40 CFR Part 61 or 40 CFR Part 63 apply to [confined animal facility](#) operations.

Rule 4101 Visible Emissions

Rule 4101 states that no air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity.

Pursuant to section 4.12, emissions subject to or specifically exempt from Regulation VIII (Fugitive PM10 Prohibitions) are exempt from Rule 4101.

Pursuant to District Rule 8011, section 4.4, on-field agricultural sources are exempt from the requirements of Regulation VIII.

On-field agricultural sources are defined in Rule 8011, section 3.35 as the following:

- Activities conducted solely for the purpose of preparing land for the growing of crops or ***the raising of fowl or animals***, such as brush or timber clearing, grubbing, scraping, ground excavation, land leveling, grading, turning under stalks, disking, or tilling;

Therefore, activities conducted solely for the purpose of raising fowl or animals are exempt from the requirements of Regulation VIII and Rule 4101.

Rule 4102 Nuisance

Rule 4102 prohibits discharge of air contaminants which could cause injury, detriment, nuisance or annoyance to the public. Public nuisance conditions are not expected as a result of these operations, provided the equipment is well maintained. Therefore, compliance with this rule is expected.

California Health & Safety Code 41700 (Health Risk Assessment)

District Policy APR 1905 – *Risk Management Policy for Permitting New and Modified Sources* specifies that for an increase in emissions associated with a proposed new source or modification, the District perform an analysis to determine the possible impact to the nearest resident or worksite.

An HRA is not required for a project with a total facility prioritization score of less than one. According to the Technical Services Memo for this project (**Appendix H**), the total facility prioritization score including this project was greater than one. Therefore, an HRA was required to determine the short-term acute and long-term chronic exposure from this project.

The cancer risk for this project is shown below:

Permit Units	Prioritization Score	Acute Hazard Index	Chronic Hazard Index	Maximum Individual Cancer Risk	T-BACT Required	Special Permit Requirements
N-8441-1-1	1.39	0.00	0.00	5.05E-08	No	No
N-8441-2-1	42.40	0.23	0.06	3.15E-06 ²	No	No
N-8441-3-2	77.40	0.01	0.00	8.67E-06	Yes	No
N-8441-4-0	0.00	0.02	0.01	0.00E+00	No	No
N-8441-5-1	N/A ¹	N/A ¹	N/A ¹	N/A ¹	No	No
Project Totals	151.81	0.26	0.08	1.19E-05		
Facility Totals	>1	0.26	0.08	1.19E-05		

Notes:

1. There is no risk associated with Unit 5 as the District does not have an approved toxic speciation profile for dairy feed and storage handling operations.
2. T-BACT is determined on a corral by corral basis.

Discussion of T-BACT

BACT for toxic emission control (T-BACT) is required if the cancer risk exceeds one in one million. As demonstrated above, T-BACT is required for this project because the HRA indicates that the risk is above the District's thresholds for triggering T-BACT requirements.

For this project T-BACT is triggered for VOC emissions from the liquid manure handling operation. T-BACT is satisfied with BACT for VOC (refer to Appendix H for the BACT analysis for the applicable toxic emissions control); therefore, compliance with the District's Risk Management Policy is expected.

District policy APR 1905 also specifies that the increase in emissions associated with a proposed new source or modification not have acute or chronic indices, or a cancer risk greater than the District's significance levels (i.e. acute and/or chronic indices greater than 1 and a cancer risk greater than 20 in a million). As outlined by the HRA Summary in Appendix H of this report, the emissions increases for this project was determined to be less than significant.

Rule 4550 Conservation Management Practices (CMP)

This rule applies to agricultural operations located within the San Joaquin Valley Air Basin. The purpose of this rule is to limit fugitive dust emissions from agricultural operations.

Pursuant to Section 4.2, dairies with at least 500 mature cows or cattle facilities with at least 190 cattle are subject to the provisions of this rule. Therefore, this facility is currently subject to the provisions of this rule as a dairy, and will continue to be subject to the provisions of this rule as a heifer ranch.

Pursuant to Section 5.1, effective on and after July 1, 2004, an owner/operator shall implement the applicable CMPs selected pursuant to Section 6.2 for each agricultural operation site.

Pursuant to Section 5.2, an owner/operator shall prepare and submit a CMP application for each agricultural operation site to the APCO for approval.

The facility received District approval for its initial dairy CMP plan on March 15, 2011 and a modified CMP plan on October 11, 2018. This proposed project does not involve any changes or modifications to the current CMP plan. Continued compliance with the requirements of this rule is therefore expected.

Rule 4570 Confined Animal Facilities (CAF)

This rule applies to Confined Animal Facilities (CAF) located within the San Joaquin Valley Air Basin. The purpose of this rule is to limit emissions of Volatile Organic Compounds (VOC) from Confined Animal Facilities (CAF) through the implementation of various mitigation measures for each emissions unit.

The facility was issued ATC permits to implement the requirements of this rule under project N-1104400. Under this project, the applicant has not proposed any changes to the mitigation measures currently practiced at the facility. All previously selected mitigation measures will be carried over in the Authority to Construct (ATC) permits issued under this project. The following are a list of the permit conditions to be included in the ATC permits for compliance with this rule:

General Condition on all ATC Permits

- *{4452} If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the permittee shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]*
- *{modified 4453} Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 2201, 4102, and 4570]*

N-8441-1-1 (Cow Milking Operation):

- *{Modified 4484} Permittee shall flush or hose down the milking parlor immediately prior to, immediately after, or during each milking. [District Rules 2201 and 4570]*
- *{Modified 4485} Permittee shall provide verification that milk parlor is flushed or hosed down immediately prior to, immediately after, or during each milking. [District Rules 2201 and 4570]*

N-8441-2-1 (Cow Housing):

- *{Modified 4454} Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rules 2201, 4102, and 4570]*

- *{Modified 4455} Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rules 2201, 4102, and 4570]*
- *{Modified 4486} Permittee shall pave feed lanes for a width of at least 8 feet along the corral side of the feed lane fence for milk and dry cows and at least 6 feet along the corral side of the feed lane fence for support stock. [District Rules 2201, 4102, and 4570]*
- *{Modified 4487} Permittee shall flush, scrape, or vacuum freestall lanes immediately prior to, immediately after or during each milking. [District Rules 2201, 4102, and 4570]*
- *{Modified 4488} Permittee shall maintain records sufficient to demonstrate that freestall lanes are flushed, scraped, or vacuumed immediately prior to, immediately after or during each milking. [District Rules 2201, 4102, and 4570]*
- *{Modified 4492} Permittee shall remove manure that is not dry from individual cow freestall beds or shall rake, harrow, scrape, or grade freestall bedding at least once every seven (7) days. [District Rules 2201 and 4570]*
- *{Modified 4493} Permittee shall record either of the following: 1) the dates when manure that is not dry is removed from individual cow freestall beds or 2) the dates when the freestall bedding is raked, harrowed, scraped, or graded. [District Rules 2201 and 4570]*
- *{Modified 4499} Permittee shall inspect water pipes and troughs and repair leaks at least once every seven (7) days. [District Rules 2201 and 4570]*
- *{Modified 4500} Permittee shall maintain records demonstrating that water pipes and troughs are inspected and leaks are repaired at least once every seven (7) days. [District Rules 2201 and 4570]*
- *{Modified 4501} Permittee shall clean manure from corrals at least four (4) times per year with at least sixty (60) days between cleanings; or permittee shall clean corrals at least once between April and July and at least once between September and December. [District Rules 2201 and 4570]*
- *{Modified 4502} Permittee shall demonstrate that manure from corrals are cleaned at least four (4) times per year with at least sixty (60) days between each cleaning or demonstrate that corrals are cleaned at least once between April and July and at least once between September and December. [District Rules 2201 and 4570]*
- *{Modified 4508} Permittee shall scrape, vacuum or flush concrete lanes in corrals at least once every day for mature cows and every seven (7) days for support stock. [District Rule 2201, 4102, and 4570]*
- *{Modified 4556} Permittee shall maintain records demonstrating that concrete lanes in corrals are scraped, vacuumed, or flushed at least once every day for mature cows and at least once every seven (7) days for support stock. [District Rules 2201 and 4570]*

- *{Modified 4554} Permittee shall implement at least one of the following corral mitigation measures: 1) slope the surface of the corrals at least 3% where the available space for each animal is 400 square feet or less and shall slope the surface of the corrals at least 1.5% where the available space for each animal is more than 400 square feet per animal; 2) maintain corrals to ensure proper drainage preventing water from standing more than forty-eight hours; or 3) harrow, rake, or scrape pens sufficiently to maintain a dry surface except during periods of rainy weather. [District Rules 2201, 4102 and 4570]*
- *{Modified 4555} Permittee shall either 1) maintain sufficient records to demonstrate that corrals and exercise pens are maintained to ensure proper drainage preventing water from standing for more than forty-eight hours and 2) maintain records of dates corrals and exercise pens are groomed (i.e. harrowed, raked, or scraped, etc.). [District Rules 2201 and 4570]*
- *{Modified 4517} Shade structures shall be installed in any of the following ways: 1) constructed with a light permeable roofing material; 2) uphill of any slope in the corral; 3) installed so that the structure has a North/South orientation. Or the permittee shall clean manure from under corral shades at least once every fourteen (14) days, when weather permits access into the corral. [District Rules 2201 and 4570]*
- *{Modified 4516} If permittee has selected to comply using shades constructed with a light permeable roofing material, then permittee shall maintain records, such as design specifications, demonstrating that the shade structures are equipped with such roofing material or if Permittee has selected to comply by cleaning the manure from under the corral shades, then Permittee shall maintain records demonstrating that manure is cleaned from under the shades at least once every fourteen (14) days, as long as weather permits access to corrals. [District Rules 2201 and 4570]*
- *{Modified 4518} Permittee shall manage corrals such that the depth in the corral does not exceed twelve (12) inches at any time or point, except for in-corral mounding. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. However, permittee must resume management of the manure depth of 12 inches or lower immediately upon the corrals becoming accessible. [District Rules 2201 and 4570]*
- *{Modified 4519} Permittee shall measure and document the depth of manure in the corrals at least once every ninety (90) days. [District Rules 2201 and 4570]*
- *{Modified 4449} Permittee shall maintain a record of the number of animals of each species and production group at the facility and shall maintain quarterly records of any changes to this information. [District Rules 2201 and 4570]*

The following conditions were added for the proposed additional mitigation measures for compliance with this rule due to this proposed project under the cow housing permit:

- *For Freestall Barns 3, 5, and 6, and Shade Barns 1 and 2, the feedlanes and walkways shall be constructed of concrete. [District Rules 2201, 4102, and 4570]*

- *For Freestall Barns 3, 5, and 6, and Shade Barns 1 and 2, the permittee shall flush the feed lanes and walkways for the mature cows (milk and dry cows) at least four times per day and for the support stock (heifers) at least once per day or scrape feed lanes and walkways for mature cows with an automatic scraper (or equivalent) four times per day and for support stock at least once per day. [District Rules 2201, 4102, and 4570]*
- *{Modified 4490} For Freestall Barns 3, 5, and 6, and Shade Barns 1 and 2, the permittee shall maintain records or maintain an operating plan that requires feed lanes and walkways for mature cows to be flushed or scraped at least four (4) times per day and the feed lanes and walkways for support stock to be flushed or scraped at least once per day. [District Rules 2201, 4102, and 4570]*
- *For the new calf hutches and new calf housing areas, the permittee shall flush or scrape these housing areas at least once every week. [District Rule 2201 and 4570]*
- *For the new calf hutches and new calf housing areas, the permittee shall keep records or maintain an operating plan that requires the new calf hutches and new calf housing areas to be flushed or scraped at least once per week. [District Rules 2201 and 4570] N*

N-8441-3-2 (Liquid Manure Handling):

- *{Modified 4454} Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rules 2201 and 4102]*
- *{Modified 4455} Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rules 2201 and 4102]*
- *{Modified 4538} Permittee shall remove solids with a solids separation system prior to the manure entering the lagoon. [District Rules 4102 and 4570]*
- *{4550} Permittee shall not allow liquid manure to stand in the fields for more than twenty-four (24) hours after irrigation. [District Rule 4570]*
- *{4551} Permittee shall maintain records to demonstrate liquid manure did not stand in the fields for more than twenty-four (24) hours after irrigation. [District Rule 4570]*

The following conditions were added for the proposed additional mitigation measures for compliance with this rule due to this proposed project under the liquid manure handling permit:

- *All liquid manure shall be treated in mechanically aerated treatment lagoons that is designed and operated according to the Natural Resources Conservative Service (NRCS) Field Office Technical Guide No. 359. [District Rules 2201, 4102, and 4570]*
- *Any liquid manure applied to land shall have been treated in mechanically aerated treatment lagoons that is designed and operated according to the NRCS Field Office Technical Guide No. 359. [District Rules 2201, 4102, and 4570]*

- *Permittee shall maintain records to demonstrate that only liquid manure that has been treated in mechanically aerated treatment lagoons is applied to the fields. [District Rules 2201, 4102, and 4570]*

N-8441-4-1 (Solid Manure Handling):

- *{Modified 4454} Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rules 2201 and 4570]*
- *{Modified 4455} Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rules 2201 and 4570]*
- *{4526} Within seventy-two (72) hours of removal of solid manure from housing, permittee shall either 1) remove dry manure from the facility, or 2) cover dry manure outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed twenty-four (24) hours per event. [District Rule 4570]*
- *{4527} Permittee shall keep records of dates when manure is removed from the facility or permittee shall maintain records to demonstrate that dry manure piles outside the pens are covered with a weatherproof covering from October through May. [District Rule 4570]*
- *{4528} If weatherproof coverings are used, permittee shall maintain records, such as manufacturer warranties or other documentation, demonstrating that the weatherproof covering over dry manure are installed, used, and maintained in accordance with manufacturer recommendations and applicable standards listed in NRCS Field Office Technical Guide Code 313 or 367, or any other applicable standard approved by the APCO, ARB, and EPA. [District Rule 4570]*

The following conditions were modified for the proposed revised mitigation measures for compliance with this rule due to this proposed project under the solid manure handling permit:

- *{Modified 4541} Solid manure shall be incorporated into the soil within two hours of land application. [District Rules 2201 and 4570]*
- *{Modified 4542} Permittee shall maintain records to demonstrate that solid manure has been incorporated into the soil within two hours of land application. [District Rules 2201 and 4570]*

N-8441-5-1 (Feed Storage and Handling):

- *{Modified 4454} Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rules 2201 and 4570]*
- *{Modified 4455} Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets,*

or feed purchase records may be used to meet this requirement. [District Rules 2201 and 4570]

- *{Modified 4456} Permittee shall push feed so that it is within three feet of the feed lane fences within two hours of putting out the feed, or use feed troughs or other feeding structures designed to maintain feed within reach of the animals. [District Rules 2201 and 4570]*
- *{Modified 4457} Permittee shall maintain an operating plan or record that requires feed to be pushed within three feet of feedlane fence within two hours of putting out the feed, or use of a feed trough or other structure designed to maintain feed within reach of the animals. [District Rules 2201 and 4570]*
- *{Modified 4458} Permittee shall begin feeding total mixed rations within two hours of grinding and mixing rations. [District Rules 2201 and 4570]*
- *{Modified 4459} Permittee shall maintain an operating plan or record of when feeding of total mixed rations began within two hours of grinding and mixing rations. [District Rules 2201 and 4570]*
- *{Modified 4460} Permittee shall store grain in a weatherproof storage structure or under a weatherproof covering from October through May. [District Rules 2201 and 4570]*
- *{Modified 4461} Permittee shall maintain records demonstrating grain is/was stored in a weatherproof storage structure or under a weatherproof covering from October through May. [District Rules 2201 and 4570]*
- *{Modified 4462} Permittee shall feed steam-flaked, dry rolled, cracked or ground corn or other steam-flaked, dry rolled, cracked or ground cereal grains. [District Rules 2201 and 4570]*
- *{Modified 4463} Permittee shall maintain records to demonstrate animals are fed steam-flaked, dry rolled, cracked or ground corn or other steam-flaked, dry rolled, cracked or ground cereal grains. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rules 2201 and 4570]*
- *{Modified 4468} For bagged silage/feedstuff, permittee shall utilize a sealed feed storage system (e.g., ag bag). [District Rules 2201 and 4570]*
- *{Modified 4469} Permittee shall cover all silage piles, except for the area where feed is being removed from the pile, with a plastic tarp that is at least five (5) mils (0.005 inches) thick, multiple plastic tarps with a cumulative thickness of at least 5 mils (0.005 inches), or an oxygen barrier film covered with a UV resistant material. Silage piles shall be covered within seventy-two (72) hours of last delivery of material to the pile. Sheets of material used to cover silage shall overlap so that silage is not exposed where the sheets meet. [District Rules 2201 and 4570]*
- *{Modified 4470} Permittee shall maintain records of the thickness and type of cover used to cover each silage pile. Permittee shall also maintain records of the date of the last delivery of material to each silage pile and the date each pile is covered. [District Rules 2201 and 4570]*

- *{Modified 4471} Permittee shall select and implement one of the following mitigation measures for building each silage pile at the facility: Option 1) build the silage pile such that the average bulk density is at least 44 lb/cu ft for corn silage and 40 lb/cu ft for other silage types, as measured in accordance with Section 7.11 of District Rule 4570; Option 2) Adjust filling parameters when creating the silage pile to achieve an average bulk density of at least 44 lb/cu ft for corn silage and at least 40 lb/cu ft for other silage types as determined using a District-approved spreadsheet; or Option 3) build silage piles using crops harvested with the applicable minimum moisture content, maximum Theoretical Length of Chop (TLC), and roller opening identified in District Rule 4570, Table 4.1, 1.d and manage silage material delivery such that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. Records of the option chosen as a mitigation measure for building each silage pile shall be maintained. [District Rules 2201 and 4570]*
- *{Modified 4472} For each silage pile that Option 1 (Measured Bulk Density) is chosen as a mitigation measure for building the pile, records of the measured bulk density shall be maintained. [District Rules 2201 and 4570]*
- *{Modified 4473} For each silage pile that Option 2 (Bulk Density Determined by Spreadsheet) is chosen as a mitigation measure for building the pile, records of the filling parameters entered into the District-approved spreadsheet to determine the bulk density shall be maintained. [District Rules 2201 and 4570]*
- *{Modified 4474} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall harvest corn used for the pile at an average moisture content of at least 65% and harvest other silage crops for the pile at an average moisture content of at least 60%. [District Rules 2201 and 4570]*
- *{Modified 4475} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, records of the average percent moisture of crops harvested for silage shall be maintained. [District Rules 2201 and 4570]*
- *{Modified 4476} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall adjust setting of equipment used to harvest crops for the pile to incorporate the following parameters for Theoretical Length of Chop (TLC) and roller opening, as applicable: 1) Corn with no processing: TLC not exceeding 1/2 inch, 2) Processed Corn: TLC not exceeding 3/4 inch and roller opening of 1-4 mm, 3) Alfalfa/Grass: TLC not exceeding 1.0 inch, 4) Other silage crops: TLC not exceeding 1/2 inch. [District Rules 2201 and 4570]*
- *{Modified 4477} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, records that equipment used to harvest crops for the pile was set to the required TLC and roller opening for the type of crop harvested shall be maintained. [District Rules 2201 and 4570]*

- *{Modified 4478} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall manage silage material delivery such that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. [District Rules 2201 and 4570]*
- *{Modified 4479} For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall maintain a plan that requires that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. [District Rules 2201 and 4570]*
- *{Modified 4480} Permittee shall select and implement at least two of the following mitigation measures for management of silage piles at the facility: Option 1) manage silage piles such that only one silage pile has an uncovered face and the total exposed surface area is less than 2,150 square feet, or manage multiple uncovered silage piles such that the total exposed surface area of all uncovered silage piles is less than 4,300 square feet; Option 2) use a shaver/facer to remove silage from the silage pile, or shall use another method to maintain a smooth vertical surface on the working face of the silage pile; or Option 3) inoculate silage with homolactic lactic acid bacteria in accordance with manufacturer recommendations to achieve a concentration of at least 100,000 colony forming units per gram of wet forage, apply propionic acid, benzoic acid, sorbic acid, sodium benzoate, or potassium sorbate at the rate specified by the manufacturer to reduce yeast counts when forming silage piles, or apply other additives at rates that have been demonstrated to reduce alcohol concentrations in silage and/or VOC emissions from silage and have been approved by the District and EPA. Records of the options chosen for managing each silage pile shall be maintained. [District Rules 2201 and 4570]*
- *{Modified 4481} If Option 1 (Limiting Exposed Area of Silage) is chosen as a mitigation measure for managing silage piles, the permittee shall calculate and record the maximum (largest part of pile) total exposed area of each silage pile. Records of the maximum calculated area shall be maintained. [District Rules 2201 and 4570]*
- *{Modified 4482} For each silage pile that Option 2 (Shaver/Facer or Smooth Face) is chosen as a mitigation measure for managing the pile, the permittee shall maintain records that a shaver/facer was used to remove silage from the pile or shall visually inspect the pile at least daily to verify that the working face was smooth and maintain records of the visual inspections. [District Rules 2201 and 4570]*
- *{Modified 4483} For each silage pile that Option 3 (Silage Additives) is chosen as a mitigation measure for managing the pile, records shall be maintained of the type additive (e.g. inoculants, preservative, other District & EPA-approved additive), the quantity of the additive applied to the pile, and a copy of the manufacturer's instructions for application of the additive. [District Rules 2201 and 4570]*

According to the District's inspection records, this facility has been operating in compliance with Rule 4570 requirements. Since the proposed modifications do not fundamentally alter the nature of the facility's operations, continued compliance with the requirements of this rule is expected.

California Health & Safety Code 42301.6 (School Notice)

The District has verified that this site is not located within 1,000 feet of a school. Therefore, pursuant to California Health and Safety Code 42301.6, a school notice is not required.

California Environmental Quality Act (CEQA)

CEQA requires each public agency to adopt objectives, criteria, and specific procedures consistent with CEQA Statutes and the CEQA Guidelines for administering its responsibilities under CEQA, including the orderly evaluation of projects and preparation of environmental documents. The District adopted its *Environmental Review Guidelines* (ERG) in 2001. The basic purposes of CEQA are to:

- Inform governmental decision-makers and the public about the potential, significant environmental effects of proposed activities;
- Identify the ways that environmental damage can be avoided or significantly reduced;
- Prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible; and
- Disclose to the public the reasons why a governmental agency approved the project in the manner the agency chose if significant environmental effects are involved.

Greenhouse Gas (GHG) Significance Determination

District is a Responsible Agency

It is determined that another agency has prepared an environmental review document for the project. The District is a Responsible Agency for the project because of its discretionary approval power over the project via its Permits Rule (Rule 2010) and New Source Review Rule (Rule 2201), (CEQA Guidelines §15381). As a Responsible Agency, the District is limited to mitigating or avoiding impacts for which it has statutory authority. The District does not have statutory authority for regulating greenhouse gas emissions. The District has determined that the applicant is responsible for implementing greenhouse gas mitigation measures, if any, imposed by the Lead Agency.

District CEQA Findings

The County of Merced (County) is the public agency having principal responsibility for approving the Project. As such, the County served as the Lead Agency for the project. On July 25, 2019 the County certified the Environmental Impact Report (EIR), finding that mobile emissions would have a significant, unavoidable impact on air quality. The County approved the project and adopted a Statement of Overriding Consideration (SOC).

The District is a Responsible Agency for the project because of its discretionary approval power over the project via its Permits Rule (Rule 2010) and New Source Review Rule (Rule 2201), (CEQA Guidelines §15381). As a Responsible Agency the District complies with CEQA by considering the EIR prepared by the Lead Agency, and by reaching its own conclusion on whether and how to approve the project involved (CEQA Guidelines §15096). The District has considered the Final EIR certified by the County.

The District's engineering evaluation of the project (this document) demonstrates that the District would impose permit conditions requiring the applicant to meet BACT. Thus, the District concludes that through a combination of project design elements and permit conditions, project specific stationary source emissions will be reduced and mitigated to less than significant levels.

The County concluded that emissions from mobile sources would have a significant impact on air quality. The District finds that impacts from mobile source emissions and greenhouse gases are within the jurisdiction of the California Air Resources Board. The District has no statutory authority over mobile source emissions and cannot impose additional mitigation measures to reduce emissions from those sources.

As a Responsible Agency the District is required to issue findings for significant air quality impacts detailed in the Lead Agency's EIR and adopt an SOC. The District has required all feasible mitigation measures to lessen stationary source emissions impacts to air quality from this project. As a single purpose agency, the District lacks the Lead Agency's broader scope of authority over the project and does not believe that it should overrule the decisions made by the Lead Agency. Accordingly, after considering the Lead Agency's EIR, the SOC, and the substantial evidence the Lead Agency relied on in adopting the SOC, the District finds that it had no basis on which to disagree with the SOC and evidence relied on therein. The District therefore adopts the Lead Agency's SOC by reference as its own.

Indemnification Agreement/Letter of Credit Determination

According to District Policy APR 2010 (CEQA Implementation Policy), when the District is the Lead or Responsible Agency for CEQA purposes, an indemnification agreement and/or a letter of credit may be required. The decision to require an indemnity agreement and/or a letter of credit is based on a case-by-case analysis of a particular project's potential for litigation risk, which in turn may be based on a project's potential to generate public concern, its potential for significant impacts, and the project proponent's ability to pay for the costs of litigation without a letter of credit, among other factors.

The criteria pollutant emissions and toxic air contaminant emissions associated with the proposed project are not significant, and there is minimal potential for public concern for this particular operation. Therefore, an Indemnification Agreement and/or a Letter of Credit will not be required for this project in the absence of expressed public concern.

IX. Recommendation

Compliance with all applicable rules and regulations is expected. Pending a successful NSR Public Noticing period, issue ATC permits N-8441-1-1, '-2-1, '-3-2, '-4-1, and '-5-0 subject to the permit conditions on the attached draft ATC permits in Appendix A.

X. Billing Information

Annual Permit Fees			
Permit Number	Fee Schedule	Fee Description	Annual Fee
N-8441-1-1	3020-06	Cow Milking Operation	\$128
N-8441-2-1	3020-06	Cow Housing	\$128
N-8441-3-2	3020-06	Liquid Manure Handling	\$128
N-8441-4-1	3020-06	Solid Manure Handling	\$128
N-8441-5-1	3020-06	Feed Storage and Handling	\$128

IX. Appendixes

- Appendix A: Draft Authority to Construct (ATC) Permits N-8441-1-1, '-2-1, '-3-1, '-4-1, and '-5-1
- Appendix B: Current Permits to Operate (PTOs) N-8441-1-0, '-2-0, '-3-1, '-4-0, and '-5-0
- Appendix C: Project Site Plan
- Appendix D: Dairy Emissions Calculations
- Appendix E: BACT Calculations
- Appendix F: BACT Guidelines
- Appendix G: Top-Down BACT Analysis
- Appendix H: RMR and AAQA Summary
- Appendix I: Quarterly Net Emissions Change (QNEC)

APPENDIX A
Draft Authority to Construct (ATC) Permits N-8441-1-1, '-2-1, '-3-2, '-4-1,
and '-5-1

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

ISSUANCE DATE: DRAFT

PERMIT NO: N-8441-1-1

LEGAL OWNER OR OPERATOR: MANUEL OLIVEIRA DAIRY

MAILING ADDRESS: 4235 OAK AVE
MERCED, CA 95340

LOCATION: 4235 OAK AVE
MERCED, CA 95340

EQUIPMENT DESCRIPTION:

MODIFICATION OF 910 COW MILKING OPERATION WITH ONE 30 STALL HERRINGBONE MILKING PARLOR TO INCREASE THE NUMBER OF MILK COWS TO 2,500 HEADS AND REPLACE THE EXISTING MILKING PARLOR WITH A 60 STALL PARALLEL MILKING PARLOR.

CONDITIONS

1. This Authority to Construct (ATC) permit shall be implemented concurrently with ATC permit N-8441-2-1. [District Rule 2201]
2. {3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
3. {3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
4. {3658} This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (209) 557-6400 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Samir Sheikh, Executive Director / APCO

Arnaud Marjollet, Director of Permit Services

N-8441-1-1 : Jun 15 2020 9:58AM -- CHANK : Joint Inspection NOT Required

5. {4452} If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
6. Permittee shall flush or hose milk parlor immediately prior to, immediately after, or during each milking. [District Rules 2201 and 4570]
7. Permittee shall provide verification that milk parlors are flushed or hosed prior to, immediately after, or during each milking. [District Rules 2201 and 4570]
8. Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 2201 and 4570]

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San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

ISSUANCE DATE: DRAFT

PERMIT NO: N-8441-2-1

LEGAL OWNER OR OPERATOR: MANUEL OLIVEIRA DAIRY

MAILING ADDRESS: 4235 OAK AVE
MERCED, CA 95340

LOCATION: 4235 OAK AVE
MERCED, CA 95340

EQUIPMENT DESCRIPTION:

MODIFICATION OF COW HOUSING - 910 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 1,040 MATURE COWS (MILK AND DRY); 901 SUPPORT STOCK (HEIFERS, CALVES AND BULLS); AND 2 FREESTALLS WITH FLUSH SYSTEM: INCREASE THE MAXIMUM NUMBER OF COWS TO 2,500 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 2,900 MATURE COWS (MILK AND DRY) AND 1,500 SUPPORT STOCK (HEIFERS AND CALVES) AND INSTALL TWO NEW FREESTALL BARNES (5 & 6), TWO SHADE BARNES (1 & 2) OVER EXISTING CORRALS, CALF HUTCHES, AND UPWIND/DOWNWIND WINDBREAKS.

CONDITIONS

1. {3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. {3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. {3658} This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (209) 557-6400 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Samir Sheikh, Executive Director / APCO

Arnaud Marjollet, Director of Permit Services

N-8441-2-1 : Jun 15 2020 10:37AM -- CHANK : Joint Inspection NOT Required

4. {4452} If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
5. Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rules 2201, 4102, and 4570]
6. Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rules 2201, 4102, and 4570]
7. For Freestall Barns 3, 5, and 6, and Shade Barns 1 and 2 the feedlanes and walkways shall be constructed of concrete. [District Rules 2201, 4102, and 4570]
8. Permittee shall flush, scrape or vacuum freestall lanes immediately prior to, immediately after or during each milking. [District Rules 2201, 4102, and 4570]
9. Permittee shall maintain records sufficient to demonstrate that freestall lanes are flushed, scraped or vacuumed immediately prior to, immediately after or during each milking. [District Rules 2201, 4102, and 4570]
10. For Freestall Barns 3, 5, and 6, and Shade Barns 1 and 2, the permittee shall flush the feed lanes and walkways for the mature cows (milk and dry cows) at least four times per day and for the support stock (heifers) at least once per day, or scrape feed lanes and walkways for the mature cows with an automatic scraper (or equivalent) four times per day and for the support stock at least once per day. [District Rules 2201, 4102, and 4570]
11. For Freestall Barns 3, 5, and 6, and Shade Barns 1 and 2, the permittee shall keep records or maintain an operating plan that requires the feed lanes and walkways for mature cows to be flushed or scraped at least four times per day and for support stock to be flushed or scraped at least once per day. [District Rules 2201, 4102, and 4570]
12. For the new calf hutches and new calf housing areas, the permittee shall flush or scrape these housing areas at least once per week. [District Rules 2201 and 4570]
13. For the new calf hutches and new calf housing areas, the permittee shall keep records or maintain an operating plan that requires the new calf hutches and new calf housing areas to be flushed or scraped at least once per week. [District Rules 2201 and 4570]
14. Permittee shall scrape exercise pen and corral surfaces every two weeks using a pull-type scraper during morning hours, except when prevented by wet conditions. [District Rules 2201 and 4102]
15. Permittee shall pave feedlanes for a width of at least 8 feet along the housing side of the feedlane fence for mature cows and at least 6 feet along the housing side of the feedlane fence for heifers. [District Rules 2201, 4102, and 4570]
16. Permittee shall remove manure that is not dry from individual cow freestall beds or shall rake, harrow, scrape, or grade freestall bedding at least once every seven (7) days. [District Rules 2201 and 4570]
17. Permittee shall record either of the following: 1) the dates when manure that is not dry is removed from individual cow freestall beds or 2) the dates when the freestall bedding is raked, harrowed, scraped, or graded. [District Rules 2201 and 4570]
18. Permittee shall inspect water pipes and troughs and repair leaks at least once every seven (7) days. [District Rules 2201 and 4570]
19. Permittee shall maintain records demonstrating that water pipes and troughs are inspected and leaks are repaired at least once every seven (7) days. [District Rules 2201 and 4570]
20. Permittee shall clean manure from corrals at least four (4) times per year with at least sixty (60) days between each cleaning, or permittee shall clean corrals at least once between April and July and at least once between September and December. [District Rules 2201 and 4570]

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CONDITIONS CONTINUE ON NEXT PAGE

21. Permittee shall demonstrate that manure from corrals are cleaned at least four (4) times per year with at least sixty (60) days between each cleaning or demonstrate that corrals are cleaned at least once between April and July and at least once between September and December. [District Rules 2201 and 4570]
22. Permittee shall implement at least one of the following corral mitigation measures: 1) slope the surface of the corrals at least 3% where the available space for each animal is 400 square feet or less and shall slope the surface of the corrals at least 1.5% where the available space for each animal is more than 400 square feet per animal; 2) maintain corrals to ensure proper drainage preventing water from standing more than forty-eight hours; or 3) harrow, rake, or scrape pens sufficiently to maintain a dry surface except during periods of rainy weather. [District Rules 2201 and 4570]
23. Permittee shall either 1) maintain sufficient records to demonstrate that corrals are maintained to ensure proper drainage preventing water from standing for more than forty-eight hours or 2) maintain records of dates pens are groomed (i.e., harrowed, raked, or scraped, etc.). [District Rules 2201 and 4570]
24. Permittee shall scrape, vacuum or flush concrete lanes in corrals at least once every day for mature cows and every seven (7) days for support stock. [District Rules 2201 and 4570]
25. Permittee shall maintain records demonstrating that concrete lanes in corrals are scraped, vacuumed, or flushed at least once every day for mature cows and at least once every seven (7) days for support stock. [District Rules 2201 and 4570]
26. Shade structures shall be installed in any of the following ways: 1) constructed with a light permeable roofing material; 2) uphill of any slope in the corral; 3) installed so that the structure has a North/South orientation. OR Permittee shall clean manure from under corral shades at least once every fourteen (14) days, when weather permits access into the corral. [District Rules 2201 and 4570]
27. If permittee has selected to comply using shades constructed with a light permeable roofing material, then permittee shall maintain records, such as design specifications, demonstrating that the shade structures are equipped with such roofing material or if Permittee has selected to comply by cleaning the manure from under the corral shades, then Permittee shall maintain records demonstrating that manure is cleaned from under the shades at least once every fourteen (14) days, as long as weather permits access to corrals. [District Rules 2201 and 4570]
28. Permittee shall manage corrals such that the manure depth in the corral does not exceed twelve (12) inches at any time or point, except for in-corral mounding. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. However, permittee must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible. [District Rules 2201 and 4570]
29. Permittee shall measure and document the depth of manure in the corrals at least once every ninety (90) days. [District Rules 2201 and 4570]
30. Permittee shall establish a continuous line of windbreaks stretching at least 600 feet along the eastern boundary of Shade Barn 1 housing area and at least 600 feet along the western boundary of Freestall Barn 6 housing area. The eastern boundary windbreaks shall consist of one row of Mule-Fat shrubs spaced 8 feet apart, one row of Fremont Cottonwood trees spaced 10 feet apart, and one row of California Sycamore trees spaced 14 feet apart. The western boundary windbreaks shall consist of one row of Mule-Fat shrubs spaced 8 feet apart and one row of Fremont Cottonwood trees spaced 10 feet apart. Each row should be offset from the adjacent row. Spacing between rows shall be sufficient to accommodate cultivation equipment, but shall not exceed 24 feet. Any alternative windbreak proposal must be approved by the District. [District Rule 2201]
31. Shrubs/trees that are initially planted as part of the windbreak shall have a minimum container size of five gallons. [District Rule 2201]
32. Windbreaks shall be irrigated and maintained for survivability and rapid growth. Dead trees and shrubs shall be replaced as necessary to maintain a windbreak density of at least 65% for downwind windbreaks and at least 50% for upwind windbreaks. Windbreak density is the percentage of the background view that is obscured or hidden when viewing through the windbreak from 60 feet to 100 feet upwind of the rows. [District Rule 2201]
33. Permittee shall maintain a record of the number of animals of each species and production group at the facility and shall maintain quarterly records of any changes to this information. [District Rules 2201 and 4570]
34. Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 2201, 4102, and 4570]

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

ISSUANCE DATE: DRAFT

PERMIT NO: N-8441-3-2

LEGAL OWNER OR OPERATOR: MANUEL OLIVEIRA DAIRY

MAILING ADDRESS: 4235 OAK AVE
MERCED, CA 95340

LOCATION: 4235 OAK AVE
MERCED, CA 95340

EQUIPMENT DESCRIPTION:

MODIFICATION OF LIQUID MANURE HANDLING SYSTEM CONSISTING OF ONE SETTLING BASIN; TWO STORAGE PONDS; MECHANICAL SEPARATOR(S); MANURE IS LAND APPLIED THROUGH FURROW IRRIGATION TO INSTALL THREE MECHANICALLY AERATED LAGOONS (391' X 200' X 10', 284' X 203' X 7', AND 345' X 200' X 7') AND INCREASE LIQUID MANURE PROCESSING DUE TO A CHANGE IN HERD PROFILE AS AUTHORIZED BY ATC PERMIT N-8441-2-1.

CONDITIONS

1. This Authority to Construct (ATC) permit shall be implemented concurrently with ATC permit N-8441-2-1. [District Rule 2201]
2. {3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
3. {3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
4. {3658} This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (209) 557-6400 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Samir Sheikh, Executive Director / APCO

Arnaud Marjollet, Director of Permit Services

N-8441-3-2 : Jun 15 2020 10:38AM -- CHANK : Joint Inspection NOT Required

5. {4452} If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
6. Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rules 2201 and 4102]
7. Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rules 2201 and 4102]
8. Permittee shall remove solids with a solid separator system, prior to the manure entering the lagoon. [District Rules 4102 and 4570]
9. All liquid manure shall be treated in mechanically aerated treatment lagoons that is designed and operated according to the Natural Resources Conservative Service (NRCS) Field Office Technical Guide No. 359. [District Rules 2201, 4102, and 4570]
10. Any liquid manure applied to land shall have been treated in mechanically aerated treatment lagoons that is designed and operated according to the NRCS Field Office Technical Guide No. 359. [District Rules 2201, 4102, and 4570]
11. Permittee shall maintain records to demonstrate that liquid manure applied to land has been treated in mechanically aerated treatment lagoons. [District Rules 2201, 4102, and 4570]
12. {4550} Permittee shall not allow liquid manure to stand in the fields for more than twenty-four (24) hours after irrigation. [District Rule 4570]
13. {4551} Permittee shall maintain records to demonstrate liquid manure did not stand in the fields for more than twenty-four (24) hours after irrigation. [District Rule 4570]
14. Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 4102 and 4570]

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San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

ISSUANCE DATE: DRAFT

PERMIT NO: N-8441-4-1

LEGAL OWNER OR OPERATOR: MANUEL OLIVEIRA DAIRY

MAILING ADDRESS: 4235 OAK AVE
MERCED, CA 95340

LOCATION: 4235 OAK AVE
MERCED, CA 95340

EQUIPMENT DESCRIPTION:

MODIFICATION OF SOLID MANURE HANDLING CONSISTING OF MANURE STOCK PILES; SOLID MANURE APPLICATION TO LAND FOR AN INCREASE IN SOLID MANURE PROCESSING DUE TO A CHANGE IN HERD PROFILE AS AUTHORIZED BY ATC PERMIT N-8441-2-1.

CONDITIONS

1. This Authority to Construct (ATC) permit shall be implemented concurrently with ATC permit N-8441-2-1. [District Rule 2201]
2. {3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
3. {3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
4. {3658} This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (209) 557-6400 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Samir Sheikh, Executive Director / APCO

Arnaud Marjollet, Director of Permit Services

N-8441-4-1 : Jun 15 2020 10:53AM -- CHANK : Joint Inspection NOT Required

5. {4452} If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
6. Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rules 2201 and 4570]
7. Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rules 2201 and 4570]
8. Solid manure shall be incorporated into the soil within two hours of land application. [District Rules 2201 and 4570]
9. Permittee shall maintain records to demonstrate that solid manure has been incorporated into the soil within two hours of land application. [District Rules 2201 and 4570]
10. {4526} Within seventy two (72) hours of removal of solid manure from housing, permittee shall either 1) remove dry manure from the facility, or 2) cover dry manure outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed twenty-four (24) hours per event. [District Rule 4570]
11. {4527} Permittee shall keep records of dates when manure is removed from the facility or permittee shall maintain records to demonstrate that dry manure piles outside the pens are covered with a weatherproof covering from October through May. [District Rule 4570]
12. {4528} If weatherproof coverings are used, permittee shall maintain records, such as manufacturer warranties or other documentation, demonstrating that the weatherproof covering over dry manure are installed, used, and maintained in accordance with manufacturer recommendations and applicable standards listed in NRCS Field Office Technical Guide Code 313 or 367, or any other applicable standard approved by the APCO, ARB, and EPA. [District Rule 4570]
13. Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 2201 and 4570]

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San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

ISSUANCE DATE: DRAFT

PERMIT NO: N-8441-5-1

LEGAL OWNER OR OPERATOR: MANUEL OLIVEIRA DAIRY

MAILING ADDRESS: 4235 OAK AVE
MERCED, CA 95340

LOCATION: 4235 OAK AVE
MERCED, CA 95340

EQUIPMENT DESCRIPTION:

MODIFICATION OF FEED STORAGE AND HANDLING CONSISTING OF COVERED FEED STORAGE OR COMMODITY BARN(S) AND SILAGE PILE(S) FOR AN INCREASE IN TOTAL MIXED RATIONS DUE TO A CHANGE IN HERD PROFILE AS AUTHORIZED BY ATC PERMIT N-8441-2-1.

CONDITIONS

1. This Authority to Construct (ATC) permit shall be implemented concurrently with ATC permit N-8441-2-1. [District Rule 2201]
2. {3215} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
3. {3216} Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
4. {3658} This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (209) 557-6400 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Samir Sheikh, Executive Director / APCO

Arnaud Marjollet, Director of Permit Services

N-8441-5-1 : Jun 15 2020 10:54AM -- CHANK : Joint Inspection NOT Required

5. {4452} If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
6. Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rules 2201 and 4570]
7. Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rules 2201 and 4570]
8. Permittee shall push feed so that it is within three feet of feedlane fence within two hours of putting out the feed or use a feed trough or other feeding structure designed to maintain feed within reach of the animals. [District Rules 2201 and 4570]
9. Permittee shall maintain an operating plan or record that requires feed to be pushed within three feet of feedlane fence within two hours of putting out the feed, or use of a feed trough or other structure designed to maintain feed within reach of the animals. [District Rules 2201 and 4570]
10. Permittee shall begin feeding total mixed rations within two hours of grinding and mixing rations. [District Rules 2201 and 4570]
11. Permittee shall maintain an operating plan or record of when feeding of total mixed rations began within two hours of grinding and mixing rations. [Districts Rule 2201 and 4570]
12. Permittee shall store grain in a weatherproof storage structure or under a weatherproof covering from October through May. [District Rules 2201 and 4570]
13. Permittee shall maintain records demonstrating grain is/was stored in a weatherproof storage structure or under a weatherproof covering from October through May. [District Rules 2201 and 4570]
14. Permittee shall feed steam-flaked, dry rolled, cracked or ground corn or other steam-flaked, dry rolled, cracked or ground cereal grains. [District Rules 2201 and 4570]
15. Permittee shall maintain records to demonstrate animals are fed steam-flaked, dry rolled, cracked or ground corn or other steam-flaked, dry rolled, cracked or ground cereal grains. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rules 2201 and 4570]
16. For bagged silage/feedstuff, permittee shall utilize a sealed feed storage system (e.g., ag bag). [District Rules 2201 and 4570]
17. Permittee shall cover all silage piles, except for the area where feed is being removed from the pile, with a plastic tarp that is at least five (5) mils (0.005 inches) thick, multiple plastic tarps with a cumulative thickness of at least 5 mils (0.005 inches), or an oxygen barrier film covered with a UV resistant material. Silage piles shall be covered within seventy-two (72) hours of last delivery of material to the pile. Sheets of material used to cover silage shall overlap so that silage is not exposed where the sheets meet. [District Rules 2201 and 4570]
18. Permittee shall maintain records of the thickness and type of cover used to cover each silage pile. Permittee shall also maintain records of the date of the last delivery of material to each silage pile and the date each pile is covered. [District Rules 2201 and 4570]

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CONDITIONS CONTINUE ON NEXT PAGE

19. Permittee shall select and implement one of the following mitigation measures for building each silage pile at the facility: Option 1) build the silage pile such that the average bulk density is at least 44 lb/cu ft for corn silage and 40 lb/cu ft for other silage types, as measured in accordance with Section 7.11 of District Rule 4570; Option 2) Adjust filling parameters when creating the silage pile to achieve an average bulk density of at least 44 lb/cu ft for corn silage and at least 40 lb/cu ft for other silage types as determined using a District-approved spreadsheet; or Option 3) build silage piles using crops harvested with the applicable minimum moisture content, maximum Theoretical Length of Chop (TLC), and roller opening identified in District Rule 4570, Table 4.1, 1.d and manage silage material delivery such that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. Records of the option chosen as a mitigation measure for building each silage pile shall be maintained. [District Rules 2201 and 4570]
20. For each silage pile that Option 1 (Measured Bulk Density) is chosen as a mitigation measure for building the pile, records of the measured bulk density shall be maintained. [District Rules 2201 and 4570]
21. For each silage pile that Option 2 (Bulk Density Determined by Spreadsheet) is chosen as a mitigation measure for building the pile, records of the filling parameters entered into the District-approved spreadsheet to determine the bulk density shall be maintained. [District Rules 2201 and 4570]
22. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall harvest corn used for the pile at an average moisture content of at least 65% and harvest other silage crops for the pile at an average moisture content of at least 60%. [District Rules 2201 and 4570]
23. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, records of the average percent moisture of crops harvested for silage shall be maintained. [District Rules 2201 and 4570]
24. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall adjust setting of equipment used to harvest crops for the pile to incorporate the following parameters for Theoretical Length of Chop (TLC) and roller opening, as applicable: 1) Corn with no processing: TLC not exceeding 1/2 inch, 2) Processed Corn: TLC not exceeding 3/4 inch and roller opening of 1-4 mm, 3) Alfalfa/Grass: TLC not exceeding 1.0 inch, 4) Other silage crops: TLC not exceeding 1/2 inch. [District Rules 2201 and 4570]
25. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, records that equipment used to harvest crops for the pile was set to the required TLC and roller opening for the type of crop harvested shall be maintained. [District Rules 2201 and 4570]
26. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall manage silage material delivery such that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. [District Rules 2201 and 4570]
27. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall maintain a plan that requires that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. [District Rules 2201 and 4570]
28. Permittee shall select and implement at least two of the following mitigation measures for management of silage piles at the facility: Option 1) manage silage piles such that only one silage pile has an uncovered face and the total exposed surface area is less than 2,150 square feet, or manage multiple uncovered silage piles such that the total exposed surface area of all uncovered silage piles is less than 4,300 square feet; Option 2) use a shaver/facer to remove silage from the silage pile, or shall use another method to maintain a smooth vertical surface on the working face of the silage pile; or Option 3) inoculate silage with homolactic lactic acid bacteria in accordance with manufacturer recommendations to achieve a concentration of at least 100,000 colony forming units per gram of wet forage, apply propionic acid, benzoic acid, sorbic acid, sodium benzoate, or potassium sorbate at the rate specified by the manufacturer to reduce yeast counts when forming silage piles, or apply other additives at rates that have been demonstrated to reduce alcohol concentrations in silage and/or VOC emissions from silage and have been approved by the District and EPA. Records of the options chosen for managing each silage pile shall be maintained. [District Rules 2201 and 4570]

29. If Option 1 (Limiting Exposed Area of Silage) is chosen as a mitigation measure for managing silage piles, the permittee shall calculate and record the maximum (largest part of pile) total exposed area of each silage pile. Records of the maximum calculated area shall be maintained. [District Rules 2201 and 4570]
30. For each silage pile that Option 2 (Shaver/Facer or Smooth Face) is chosen as a mitigation measure for managing the pile, the permittee shall maintain records that a shaver/facer was used to remove silage from the pile or shall visually inspect the pile at least daily to verify that the working face was smooth and maintain records of the visual inspections. [District Rules 2201 and 4570]
31. For each silage pile that Option 3 (Silage Additives) is chosen as a mitigation measure for managing the pile, records shall be maintained of the type additive (e.g. inoculants, preservative, other District & EPA-approved additive), the quantity of the additive applied to the pile, and a copy of the manufacturers instructions for application of the additive. [District Rules 2201 and 4570]
32. Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rules 2201 and 4570]

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APPENDIX B

Current Permits to Operate (PTOs) N-8441-1-0, '-2-0, '-3-0, '-4-0, and '-5-0

San Joaquin Valley Air Pollution Control District

PERMIT UNIT: N-8441-1-0

EXPIRATION DATE: 03/31/2023

EQUIPMENT DESCRIPTION:

910 COW MILKING OPERATION WITH ONE 30 STALL HERRINGBONE MILKING PARLOR

PERMIT UNIT REQUIREMENTS

1. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]
4. If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
5. Permittee shall flush or hose milk parlor immediately prior to, immediately after, or during each milking. [District Rule 4570]
6. Permittee shall provide verification that milk parlors are flushed or hosed prior to, immediately after, or during each milking. [District Rule 4570]
7. Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rule 4570]

These terms and conditions are part of the Facility-wide Permit to Operate.

San Joaquin Valley Air Pollution Control District

PERMIT UNIT: N-8441-2-0

EXPIRATION DATE: 03/31/2023

EQUIPMENT DESCRIPTION:

COW HOUSING - 910 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 1,040 MATURE COWS (MILK AND DRY); 901 SUPPORT STOCK (HEIFERS, CALVES AND BULLS); AND 2 FREESTALLS WITH FLUSH SYSTEM

PERMIT UNIT REQUIREMENTS

1. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]
4. If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
5. Permittee shall pave feedlanes, where present, for a width of at least 8 feet along the corral side of the feedlane fence for milk and dry cows and at least 6 feet along the corral side of the feedlane for heifers. [District Rule 4570]
6. Permittee shall flush, scrape or vacuum freestall lanes immediately prior to, immediately after or during each milking. [District Rule 4570]
7. Permittee shall maintain records sufficient to demonstrate that freestall lanes are flushed, scraped or vacuumed immediately prior to, immediately after or during each milking. [District Rule 4570]
8. Permittee shall remove manure that is not dry from individual cow freestall beds or shall rake, harrow, scrape, or grade freestall bedding at least once every seven (7) days. [District Rule 4570]
9. Permittee shall record either of the following: 1) the dates when manure that is not dry is removed from individual cow freestall beds or 2) the dates when the freestall bedding is raked, harrowed, scraped, or graded. [District Rule 4570]
10. Permittee shall inspect water pipes and troughs and repair leaks at least once every seven (7) days. [District Rule 4570]
11. Permittee shall maintain records demonstrating that water pipes and troughs are inspected and leaks are repaired at least once every seven (7) days. [District Rule 4570]
12. Permittee shall clean manure from corrals at least four (4) times per year with at least sixty (60) days between each cleaning, or permittee shall clean corrals at least once between April and July and at least once between September and December. [District Rule 4570]

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

These terms and conditions are part of the Facility-wide Permit to Operate.

13. Permittee shall demonstrate that manure from corrals are cleaned at least four (4) times per year with at least sixty (60) days between each cleaning or demonstrate that corrals are cleaned at least once between April and July and at least once between September and December. [District Rule 4570]
14. Permittee shall implement at least one of the following corral mitigation measures: 1) slope the surface of the corrals at least 3% where the available space for each animal is 400 square feet or less and shall slope the surface of the corrals at least 1.5% where the available space for each animal is more than 400 square feet per animal; 2) maintain corrals to ensure proper drainage preventing water from standing more than forty-eight hours; or 3) harrow, rake, or scrape pens sufficiently to maintain a dry surface except during periods of rainy weather. [District Rule 4570]
15. Permittee shall either 1) maintain sufficient records to demonstrate that corrals are maintained to ensure proper drainage preventing water from standing for more than forty-eight hours or 2) maintain records of dates pens are groomed (i.e., harrowed, raked, or scraped, etc.). [District Rule 4570]
16. Permittee shall scrape, vacuum or flush concrete lanes in corrals at least once every day for mature cows and every seven (7) days for support stock. [District Rule 4570]
17. Permittee shall maintain records demonstrating that concrete lanes in corrals are scraped, vacuumed, or flushed at least once every day for mature cows and at least once every seven (7) days for support stock. [District Rule 4570]
18. Shade structures shall be installed in any of the following ways: 1) constructed with a light permeable roofing material; 2) uphill of any slope in the corral; 3) installed so that the structure has a North/South orientation. OR Permittee shall clean manure from under corral shades at least once every fourteen (14) days, when weather permits access into the corral. [District Rule 4570]
19. If permittee has selected to comply using shades constructed with a light permeable roofing material, then permittee shall maintain records, such as design specifications, demonstrating that the shade structures are equipped with such roofing material or if Permittee has selected to comply by cleaning the manure from under the corral shades, then Permittee shall maintain records demonstrating that manure is cleaned from under the shades at least once every fourteen (14) days, as long as weather permits access to corrals. [District Rule 4570]
20. Permittee shall manage corrals such that the manure depth in the corral does not exceed twelve (12) inches at any time or point, except for in-corral mounding. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. However, permittee must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible. [District Rule 4570]
21. Permittee shall measure and document the depth of manure in the corrals at least once every ninety (90) days. [District Rule 4570]
22. Permittee shall maintain a record of the number of animals of each species and production group at the facility and shall maintain quarterly records of any changes to this information. [District Rule 4570]
23. Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rule 4570]

These terms and conditions are part of the Facility-wide Permit to Operate.

San Joaquin Valley Air Pollution Control District

PERMIT UNIT: N-8441-3-1

EXPIRATION DATE: 03/31/2023

EQUIPMENT DESCRIPTION:

LIQUID MANURE HANDLING SYSTEM CONSISTING OF ONE SETTLING BASIN, TWO STORAGE PONDS, MECHANICAL SEPARATOR(S). MANURE IS LAND APPLIED THROUGH FURROW IRRIGATION.

PERMIT UNIT REQUIREMENTS

1. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]
4. If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
5. Permittee shall remove solids with a solid separator system, prior to the manure entering the lagoon. [District Rule 4570]
6. Permittee shall not allow liquid manure to stand in the fields for more than twenty-four (24) hours after irrigation. [District Rule 4570]
7. Permittee shall maintain records to demonstrate liquid manure did not stand in the fields for more than twenty-four (24) hours after irrigation. [District Rule 4570]
8. Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rule 4570]

These terms and conditions are part of the Facility-wide Permit to Operate.

San Joaquin Valley Air Pollution Control District

PERMIT UNIT: N-8441-5-0

EXPIRATION DATE: 03/31/2023

EQUIPMENT DESCRIPTION:

FEED STORAGE AND HANDLING CONSISTING OF COVERED FEED STORAGE OR COMMODITY BARN(S) AND SILAGE PILE(S)

PERMIT UNIT REQUIREMENTS

1. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]
4. If a licensed veterinarian or a certified nutritionist determines that any VOC mitigation measure will be required to be suspended as a detriment to animal health or necessary for the animal to molt, the owners/operators must notify the District in writing within forty-eight (48) hours of the determination including the duration and the specific health condition requiring the mitigation measure to be suspended. If the situation is expected to exist longer than a thirty-day (30) period, the owner/operator shall submit a new emission mitigation plan designating a mitigation measure to be implemented in lieu of the suspended mitigation measure. [District Rule 4570]
5. Permittee shall feed all animals according to National Research Council (NRC) guidelines. [District Rule 4570]
6. Permittee shall maintain records of feed content, formulation, and quantity of feed additive utilized, to demonstrate compliance with National Research Council (NRC) guidelines. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rule 4570]
7. Permittee shall push feed so that it is within three feet of feedlane fence within two hours of putting out the feed or use a feed trough or other feeding structure designed to maintain feed within reach of the animals. [District Rule 4570]
8. Permittee shall maintain an operating plan or record that requires feed to be pushed within three feet of feedlane fence within two hours of putting out the feed, or use of a feed trough or other structure designed to maintain feed within reach of the animals. [District Rule 4570]
9. Permittee shall begin feeding total mixed rations within two hours of grinding and mixing rations. [District Rule 4570]
10. Permittee shall maintain an operating plan or record of when feeding of total mixed rations began within two hours of grinding and mixing rations. [District Rule 4570]
11. Permittee shall store grain in a weatherproof storage structure or under a weatherproof covering from October through May. [District Rule 4570]
12. Permittee shall maintain records demonstrating grain is/was stored in a weatherproof storage structure or under a weatherproof covering from October through May. [District Rule 4570]

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

These terms and conditions are part of the Facility-wide Permit to Operate.

13. Permittee shall feed steam-flaked, dry rolled, cracked or ground corn or other steam-flaked, dry rolled, cracked or ground cereal grains. [District Rule 4570]
14. Permittee shall maintain records to demonstrate animals are fed steam-flaked, dry rolled, cracked or ground corn or other steam-flaked, dry rolled, cracked or ground cereal grains. Records such as feed company guaranteed analyses (feed tags), ration sheets, or feed purchase records may be used to meet this requirement. [District Rule 4570]
15. For bagged silage/feedstuff, permittee shall utilize a sealed feed storage system (e.g., ag bag). [District Rule 4570]
16. Permittee shall cover all silage piles, except for the area where feed is being removed from the pile, with a plastic tarp that is at least five (5) mils (0.005 inches) thick, multiple plastic tarps with a cumulative thickness of at least 5 mils (0.005 inches), or an oxygen barrier film covered with a UV resistant material. Silage piles shall be covered within seventy-two (72) hours of last delivery of material to the pile. Sheets of material used to cover silage shall overlap so that silage is not exposed where the sheets meet. [District Rule 4570]
17. Permittee shall maintain records of the thickness and type of cover used to cover each silage pile. Permittee shall also maintain records of the date of the last delivery of material to each silage pile and the date each pile is covered. [District Rule 4570]
18. Permittee shall select and implement one of the following mitigation measures for building each silage pile at the facility: Option 1) build the silage pile such that the average bulk density is at least 44 lb/cu ft for corn silage and 40 lb/cu ft for other silage types, as measured in accordance with Section 7.11 of District Rule 4570; Option 2) Adjust filling parameters when creating the silage pile to achieve an average bulk density of at least 44 lb/cu ft for corn silage and at least 40 lb/cu ft for other silage types as determined using a District-approved spreadsheet; or Option 3) build silage piles using crops harvested with the applicable minimum moisture content, maximum Theoretical Length of Chop (TLC), and roller opening identified in District Rule 4570, Table 4.1, 1.d and manage silage material delivery such that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. Records of the option chosen as a mitigation measure for building each silage pile shall be maintained. [District Rule 4570]
19. For each silage pile that Option 1 (Measured Bulk Density) is chosen as a mitigation measure for building the pile, records of the measured bulk density shall be maintained. [District Rule 4570]
20. For each silage pile that Option 2 (Bulk Density Determined by Spreadsheet) is chosen as a mitigation measure for building the pile, records of the filling parameters entered into the District-approved spreadsheet to determine the bulk density shall be maintained. [District Rule 4570]
21. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall harvest corn used for the pile at an average moisture content of at least 65% and harvest other silage crops for the pile at an average moisture content of at least 60%. [District Rule 4570]
22. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, records of the average percent moisture of crops harvested for silage shall be maintained. [District Rule 4570]
23. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall adjust setting of equipment used to harvest crops for the pile to incorporate the following parameters for Theoretical Length of Chop (TLC) and roller opening, as applicable: 1) Corn with no processing: TLC not exceeding 1/2 inch, 2) Processed Corn: TLC not exceeding 3/4 inch and roller opening of 1-4 mm, 3) Alfalfa/Grass: TLC not exceeding 1.0 inch, 4) Other silage crops: TLC not exceeding 1/2 inch. [District Rule 4570]
24. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, records that equipment used to harvest crops for the pile was set to the required TLC and roller opening for the type of crop harvested shall be maintained. [District Rule 4570]
25. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall manage silage material delivery such that the thickness of the layer of un-compacted material delivered on top of the pile is no more than six (6) inches. [District Rule 4570]

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

These terms and conditions are part of the Facility-wide Permit to Operate.

26. For each silage pile that Option 3 (Moisture, TLC, Roller Opening, & Material Delivery) is chosen as a mitigation measure for building the pile, the permittee shall maintain a plan that requires that the thickness of the layer of uncompacted material delivered on top of the pile is no more than six (6) inches. [District Rule 4570]
27. Permittee shall select and implement at least two of the following mitigation measures for management of silage piles at the facility: Option 1) manage silage piles such that only one silage pile has an uncovered face and the total exposed surface area is less than 2,150 square feet, or manage multiple uncovered silage piles such that the total exposed surface area of all uncovered silage piles is less than 4,300 square feet; Option 2) use a shaver/facer to remove silage from the silage pile, or shall use another method to maintain a smooth vertical surface on the working face of the silage pile; or Option 3) inoculate silage with homolactic lactic acid bacteria in accordance with manufacturer recommendations to achieve a concentration of at least 100,000 colony forming units per gram of wet forage, apply propionic acid, benzoic acid, sorbic acid, sodium benzoate, or potassium sorbate at the rate specified by the manufacturer to reduce yeast counts when forming silage piles, or apply other additives at rates that have been demonstrated to reduce alcohol concentrations in silage and/or VOC emissions from silage and have been approved by the District and EPA. Records of the options chosen for managing each silage pile shall be maintained. [District Rule 4570]
28. If Option 1 (Limiting Exposed Area of Silage) is chosen as a mitigation measure for managing silage piles, the permittee shall calculate and record the maximum (largest part of pile) total exposed area of each silage pile. Records of the maximum calculated area shall be maintained. [District Rule 4570]
29. For each silage pile that Option 2 (Shaver/Facer or Smooth Face) is chosen as a mitigation measure for managing the pile, the permittee shall maintain records that a shaver/facer was used to remove silage from the pile or shall visually inspect the pile at least daily to verify that the working face was smooth and maintain records of the visual inspections. [District Rule 4570]
30. For each silage pile that Option 3 (Silage Additives) is chosen as a mitigation measure for managing the pile, records shall be maintained of the type additive (e.g. inoculants, preservative, other District & EPA-approved additive), the quantity of the additive applied to the pile, and a copy of the manufacturers instructions for application of the additive. [District Rule 4570]
31. Permittee shall keep and maintain all records for a minimum of five (5) years and shall make records available to the APCO and EPA upon request. [District Rule 4570]

These terms and conditions are part of the Facility-wide Permit to Operate.

San Joaquin Valley Air Pollution Control District

PERMIT UNIT: N-8441-6-0

EXPIRATION DATE: 03/31/2023

EQUIPMENT DESCRIPTION:

175 BHP CUMMINS TIER 2 CERTIFIED DIESEL-FIRED EMERGENCY STANDBY IC ENGINE POWERING AN ELECTRICAL GENERATOR

PERMIT UNIT REQUIREMENTS

1. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
2. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]
3. This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]
4. No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
5. No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]
6. Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]
7. This engine shall be equipped with a non-resettable hour meter with a minimum display capability of 9,999 hours, unless the District determines that a non-resettable hour meter with a different minimum display capability is appropriate in consideration of the historical use of the engine and the owner or operator's compliance history. [District Rule 4702 and 17 CCR 93115]
8. Only CARB certified diesel fuel containing not more than 0.0015% sulfur by weight is to be used. [District Rules 2201 and 4801, and 17 CCR 93115]
9. This engine shall be operated and maintained in proper operating condition as recommended by the engine manufacturer or emissions control system supplier. [District Rule 4702]
10. During periods of operation for maintenance, testing, and required regulatory purposes, the permittee shall monitor the operational characteristics of the engine as recommended by the manufacturer or emission control system supplier (for example: check engine fluid levels, battery, cables and connections; change engine oil and filters; replace engine coolant; and/or other operational characteristics as recommended by the manufacturer or supplier). [District Rule 4702]
11. An emergency situation is an unscheduled electrical power outage caused by sudden and reasonably unforeseen natural disasters or sudden and reasonably unforeseen events beyond the control of the permittee. [District Rule 4702 and 17 CCR 93115]
12. This engine shall not be used to produce power for the electrical distribution system, as part of a voluntary utility demand reduction program, or for an interruptible power contract. [District Rule 4702 and 17 CCR 93115]

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

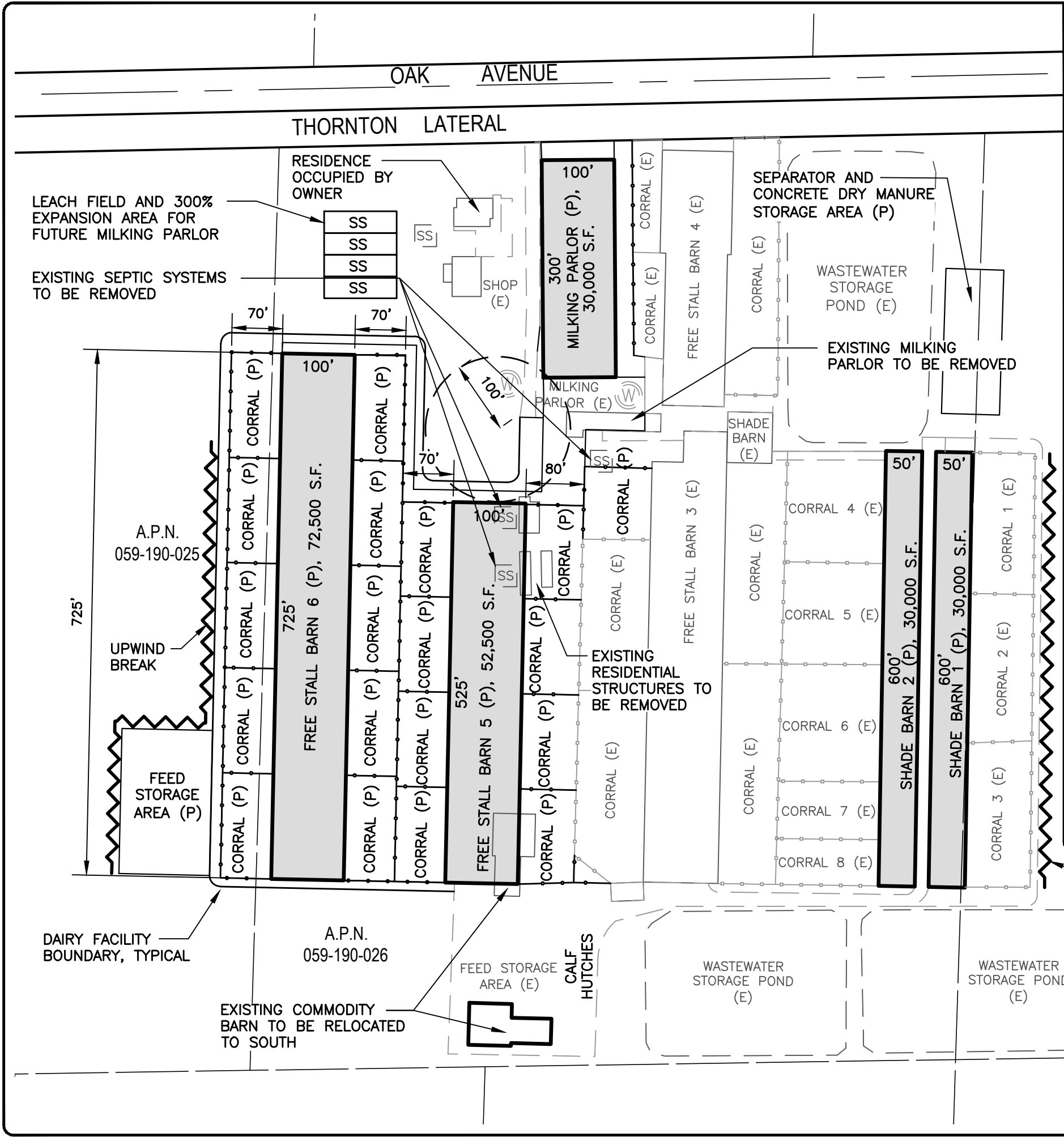
These terms and conditions are part of the Facility-wide Permit to Operate.

13. This engine shall be operated only for testing and maintenance of the engine, required regulatory purposes, and during emergency situations. Operation of the engine for maintenance, testing, and required regulatory purposes shall not exceed 100 hours per calendar year. [District Rule 4702]
14. The permittee shall maintain monthly records of emergency and non-emergency operation. Records shall include the number of hours of emergency operation, the date and number of hours of all testing and maintenance operations, the purpose of the operation (for example: load testing, weekly testing, rolling blackout, general area power outage, etc.) and records of operational characteristics monitoring. For units with automated testing systems, the operator may, as an alternative to keeping records of actual operation for testing purposes, maintain a readily accessible written record of the automated testing schedule. [District Rule 4702 and 17 CCR 93115]
15. The permittee shall maintain monthly records of the type of fuel purchased. [District Rule 4702 and 17 CCR 93115]
16. All records shall be maintained and retained on-site for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rule 4702 and 17 CCR 93115]

These terms and conditions are part of the Facility-wide Permit to Operate.

APPENDIX C

Project Site Plan



LEGEND

CORRAL (E)

EXISTING FACILITY IMPROVEMENT

EXISTING COUNTOUR AND ELEVATION PER USGS QUADRANGLE MAP

EXISTING FENCE

PROPOSED FENCE

CORRAL (P)

FREE STALL BARN (P)

PROPOSED FACILITY IMPROVEMENT

PROPOSED STRUCUTURE

PROPOSED SEPTIC SYSTEM

EXISTING WELL

LOCATION OF EXISTING SEPTIC TANK AND LEACH FIELD

WINDBREAK LOCATION

PROJECT SITE INFORMATION

PROPERTY OWNER: MANUEL AND MARIA OLIVEIRA
4235 OAK AVENUE
MERCED, CA 95340

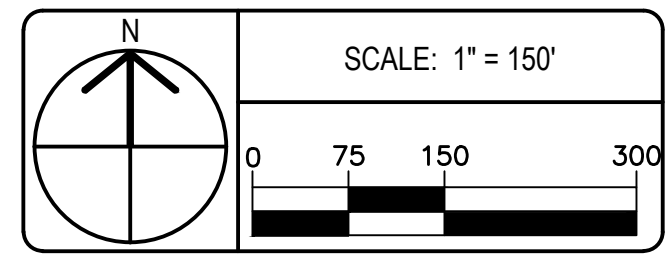
ASSESSOR'S PARCEL NUMBERS: 059-190-025, 059-190-026, 059-190-027

GROSS SITE AREA: 46.7 ACRES

EXISTING BUILDING SQUARE FOOTAGE: 104,100 S.F. (6,400 S.F. TO BE REMOVED)

PROPOSED BUILDING SQUARE FOOTAGE: 215,000 S.F.

PERCENTAGE OF SITE COVERAGE BY BUILDINGS: 15.4%



SHEET 1 OF 1

SOUSA ENGINEERING
INFRASTRUCTURE - DEVELOPMENT - AGRICULTURE
PH: (209)238-3151
WWW.SOUSAENG.COM

PO BOX 1613
OAKDALE, CA 95361

SITE AND HOUSING PLAN
TO ACCOMPANY SJVAPCD ATC APPLICATION
MANUEL OLIVEIRA DAIRY
MERCED COUNTY, CA

SYMBOL	REVISIONS	DESCRIPTION	APPD.

DRAWN BY: MS
DATE: 8/5/2019
FILE: 02_SJVAPCD_housing.dwg
JOB NO.: 2015-025

APPENDIX D

Dairy Emissions Calculations

Pre-Project Facility Information

- Does this facility house Holstein or Jersey cows?
Most facilities house Holstein cows unless explicitly stated on the PTO or application.
- Does the facility have an anaerobic treatment lagoon?
- Does the facility land apply liquid manure?
Answering "yes" assumes worst case.
- Does the facility land apply solid manure?
Answering "yes" assumes worst case.
- Is any scraped manure sent to a lagoon/storage pond?
Answering "yes" assumes worst case.

Pre-Project Herd Size						
Herd	Flushed Freestalls	Scraped Freestalls	Flushed Corrals	Scraped Corrals	Total # of Animals	
Milk Cows	910				910	
Dry Cows	130				130	
Support Stock (Heifers, Calves, and Bulls)					0	
Large Heifers			435		435	
Medium Heifers			234		234	
Small Heifers			77		77	
Bulls					0	
	Calf Hutches				Calf Corrals	
	Aboveground Flushed	Aboveground Scraped	On-Ground Flushed	On-Ground Scraped	Flushed	Scraped
Calves		155				
					155	

Total Herd Summary	
Total Milk Cows	910
Total Mature Cows	1,040
Support Stock (Heifers, Calves, and Bulls)	746
Total Calves	155
Total Dairy Head	1,941

Pre-Project Silage Information			
Feed Type	Max # Open Piles	Max Height (ft)	Max Width (ft)
Corn	1	20	150
Alfalfa			
Wheat	1	20	150

Post-Project Facility Information

- Does this facility house Holstein or Jersey cows?
Most facilities house Holstein cows unless explicitly stated on the PTO or application.
- Does the facility have an anaerobic treatment lagoon?
- Does the facility land apply liquid manure?
Answering "yes" assumes worst case.
- Does the facility land apply solid manure?
Answering "yes" assumes worst case.
- Is any scraped manure sent to a lagoon/storage pond?
Answering "yes" assumes worst case.
- Does this project result in an increase or relocation of uncovered surface area for any lagoon/storage pond?

Post-Project Herd Size						
Herd	Flushed Freestalls	Scraped Freestalls	Flushed Corrals	Scraped Corrals	Total # of Animals	
Milk Cows	2,500				2,500	
Dry Cows			400		400	
Support Stock (Heifers, Calves, and Bulls)					0	
Large Heifers			375		375	
Medium Heifers			375		375	
Small Heifers			375		375	
Bulls					0	
	Calf Hutches				Calf Corrals	
	Aboveground Flushed	Aboveground Scraped	On-Ground Flushed	On-Ground Scraped	Flushed	Scraped
Calves		375				
					375	

Total Herd Summary	
Total Milk Cows	2,500
Total Mature Cows	2,900
Support Stock (Heifers, Calves, and Bulls)	1,125
Total Calves	375
Total Dairy Head	4,400

Post-Project Silage Information			
Feed Type	Max # Open Piles	Max Height (ft)	Max Width (ft)
Corn	1	20	150
Alfalfa			
Wheat	1	20	150

VOC Mitigation Measures and Control Efficiencies

Milking Parlor				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	VOC Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Enteric Emissions Mitigations		
☒	☒	(D) Feed according to NRC guidelines	10%	10%
Total Control Efficiency			10%	10%
		Milking Parlor Floor Mitigations		
☒	☒	(D) Feed according to NRC guidelines	10%	10%
☒	☒	(D) Flush or hose milk parlor immediately prior to, immediately after, or during each milking. <i>Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF.</i>	10%	0%
Total Control Efficiency			19%	10%

Cow Housing				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	VOC Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Enteric Emissions Mitigations		
☒	☒	Feed according to NRC guidelines	10%	10%
Total Control Efficiency			10%	10%
		Corrals/Pens Mitigations		
☒	☒	Feed according to NRC guidelines	10%	10%
☒	☒	Inspect water pipes and troughs and repair leaks at least once every seven days. <i>Note: If selected for dairies > 999 milk cows, CE is already included in EF.</i>	10%	0%
☒	☒	Dairies: Clean manure from corrals at least four times per year with at least 60 days between cleaning, or clean corrals at least once between April and July and at least once between September and December. <i>Note: If selected for dairies > 999 milk cows, CE is already included in EF. Note: No additional control given for increased cleaning frequency (e.g. BACT requirement).</i> Heifer/Calf, Ranches: Scrape corrals twice a year with at least 90 days between cleanings, excluding in-corral mounds. <i>Note: No additional control given for increased cleaning frequency (e.g. BACT requirement).</i>	10%	0%
☒	☒	Scrape, vacuum, or flush concrete lanes in corrals at least once every day for mature cows and every seven days for support stock, or clean concrete lanes such that the depth of manure does not exceed 12 inches at any point or time. <i>Note: No additional control given for increased cleaning frequency (e.g. BACT requirement).</i>	10%	10%
☒	☒	Implement one of the following: 1) slope the surface of the corrals at least 3% where the available space for each animal is 400 sq ft or less and slope the surface of the corrals at least 1.5% where the available space for each animal is more than 400 sq ft; 2) maintain corrals to ensure proper drainage preventing water from standing more than 48 hrs; 3) harrow, rake, or scrape pens sufficiently to maintain a dry surface. <i>Note: If selected for dairies > 999 milk cows, CE already included in EF.</i>	10%	0%
☐	☐	Install shade structures such that they are constructed with a light permeable roofing material. <i>Note: If selected for dairies > 999 milk cows, the control efficiency will be 5% since the EF used includes a partial control for this measure.</i>	10%	5%
☐	☒	Install all shade structures uphill of any slope in the corral. <i>Note: If selected for dairies > 999 milk cows, the control efficiency will be 5% since the EF used includes a partial control for this measure.</i>		
☐	☐	Clean manure from under corral shades at least once every 14 days, when weather permits access into corral. <i>Note: If selected for dairies > 999 milk cows, the control efficiency will be 5% since the EF used includes a partial control for this measure.</i>		
☒	☒	Install shade structure so that the structure has a North/South orientation. <i>Note: If selected for dairies > 999 milk cows, the control efficiency will be 5% since the EF used includes a partial control for this measure.</i>		
☒	☒	Manage corrals such that the manure depth in the corral does not exceed 12 inches at any time or point, except for in-corral mounding. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. The manure facility must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible. <i>Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF.</i>	10%	0%
☒	☒	Knockdown fence line manure build-up prior to it exceeding a height of 12 inches at any time or point. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. The facility must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible.	10%	10%
☐	☐	Use lime or a similar absorbent material in the corral according to the manufacturer's recommendation to minimize moisture in the corrals.	0%	0%
☐	☐	Apply thymol to the corral soil in accordance with the manufacturer's recommendation.	0%	0%
Total Control Efficiency			56.95%	30.75%
		Bedding Mitigations		
☒	☒	Feed according to NRC guidelines	10%	10%

☐	☐	Use non-manure-based bedding and non-separated solids based bedding for at least 90% of the bedding material, by weight, for freestalls (e.g. rubber mats, almond shells, sand, or waterbeds).	0%	0%
☒	☒	For a large dairy (1,000 milk cows or larger) or a heifer/calf ranch - Remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every 7 days.	10%	10%
☐	☐	(D) For a medium dairy only (500 to 999 milk cows) - Remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every 14 days.	0%	0%
Total Control Efficiency			19.00%	19.00%
Lanes Mitigations				
☒	☒	Feed according to NRC guidelines	10%	10%
☒	☒	Pave feedlanes, where present, for a width of at least 8 feet along the corral side of the feedlane fence for milk and dry cows and at least 6 feet along the corral side of the feedlane for heifers. Note: No control efficiency at this time.	0%	0%
☒	☒	Dairies: Flush, scrape, or vacuum freestall flush lanes immediately prior to or after, or during each milking; or flush or scrape freestall flush lanes at least 3 times per day. Heifer/Calf Ranches: Vacuum, scrape, or flush freestalls at least once every seven days.	10%	10%
☐	☐	(D) Have no animals in exercise pens or corrals at any time.	0%	0%
Total Control Efficiency			19.00%	19.00%

Liquid Manure Handling				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	VOC Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Lagoons/Storage Ponds Mitigations		
☒	☒	Feed according to NRC guidelines	10%	10%
☐	☐	Use phototropic lagoon	0%	0%
☐	☒	Use an anaerobic treatment lagoon designed according to NRCS Guideline No. 359, or aerobic treatment lagoon, or mechanically aerated lagoon, or covered lagoon digester vented to a control device with minimum 95% control	0%	40%
☒	☒	Remove solids from the waste system with a solid separator system, prior to the waste entering the lagoon. Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF.	10%	0%
☐	☐	Maintain lagoon pH between 6.5 and 7.5	0%	0%
Total Control Efficiency			19.00%	46.00%
		Liquid Manure Land Application Mitigations		
☒	☒	Feed according to NRC guidelines	10%	10%
☐	☒	Only apply liquid manure that has been treated with an anaerobic or aerobic treatment lagoon, aerobic lagoon, or digester system	0%	40%
☒	☒	Allow liquid manure to stand in the fields for no more than 24 hours after irrigation. Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF.	10%	0%
☐	☐	Apply liquid/slurry manure via injection with drag hose or similar apparatus	0%	0%
Total Control Efficiency			19.00%	46.00%

Solid Manure Handling				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	VOC Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Solid Manure Storage Mitigations		
☒	☒	Feed according to NRC guidelines	10%	10%
☐	☒	LARGE CAFO ONLY: Within 72 hours of removal from housing, either a) remove dry manure from the facility, or b) cover dry manure outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed 24 hours per event.	0%	10%
Total Control Efficiency			10.00%	19.00%
		Separated Solids Piles Mitigations		
☒	☒	Feed according to NRC guidelines	10%	10%
☐	☒	LARGE CAFO ONLY: Within 72 hours of removal from the drying process, either a) remove separated solids from the facility, or b) cover separated solids outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed 24 hours per event.	0%	10%
Total Control Efficiency			10.00%	19.00%
		Solid Manure Land Application Mitigations		
☒	☒	Feed according to NRC guidelines	10%	10%
☒	☒	Incorporate all solid manure within 72 hours of land application. Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF. Note: No additional control given for rapid manure incorporation (e.g. BACT requirement).	10%	0%
☐	☒	Only apply solid manure that has been treated with an anaerobic treatment lagoon, aerobic lagoon or digester system.	0%	40%
☐	☐	Apply no solid manure with a moisture content of more than 50%	0%	0%
Total Control Efficiency			19.00%	46.00%

Silage and TMR				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	VOC Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Corn/Alfalfa/Wheat Silage Mitigations		
		1. Utilize a sealed feed storage system (e.g. Ag-Bag) for bagged silage, or		

☒	☒	2. Cover the surface of silage piles, except for the area where feed is being removed from the pile, with a plastic tarp that is at least 5 mils thick (0.005 inches), multiple plastic tarps with a cumulative thickness of at least 5 mils (0.005 inches), or an oxygen barrier film covered with a UV resistant material within 72 hours of last delivery of material to the pile, and implement one of the following: a) build silage piles such that the average bulk density is at least 44 lb/cu-ft for corn silage and 40 lb/cu-ft for other silage types, as measured in accordance with Section 7.10 of Rule 4570, b) when creating a silage pile, adjust filling parameters to assure a calculated average bulk density of at least 44 lb/cu-ft for corn silage and at least 40 lb/cu-ft for other silage types, using a spreadsheet approved by the District, c) harvest silage crop at > or = 65% moisture for corn; and >= 60% moisture for alfalfa/grass and other silage crops; manage silage material delivery such that no more than 6 inches of materials are uncompacted on top of the pile; and incorporate the applicable Theoretical Length of Chop (TLC) and roller opening for the crop being harvested. <u>For dairies</u> - implement <u>two</u> of the following: <u>For heifer/calf ranches</u> - implement <u>one</u> of the following: <u>Manage Exposed Silage.</u> a) manage silage piles such that only one silage pile has an uncovered face and the uncovered face has a total exposed surface area of less than 2,150 sq. ft., or b) manage multiple uncovered silage piles such that the total exposed surface area of all silage piles is less than 4,300 sq ft. <u>Maintain Silage Working Face.</u> a) use a shaver/facer to remove silage from the silage pile, or b) maintain a smooth vertical surface on the working face of the silage pile <u>Silage Additive:</u> a) inoculate silage with homolactic acid bacteria in accordance with manufacturer recommendations to achieve a concentration of at least 100,000 colony forming units per gram of wet forage or apply propionic acid, benzoic acid, sorbic acid, sodium benzoate, or potassium sorbate at a rate specified by the manufacturer to reduce yeast counts when forming silage pile; or b) apply other additives at specified rates that have been demonstrated to reduce alcohol concentrations in silage and/or VOC emissions from silage and have been approved by the District and EPA.	39.0%	39.0%
Total Control Efficiency*			39.00%	39.00%

*Assumes 25% control for density mitigation measures and 10% each for the two optional measures, resulting in an overall control of 39%. The same conservative control efficiency will be applied to the sealed feed storage system (Ag-Bag).

		TMR Mitigations		
☒	☒	(D) Push feed so that it is within 3 feet of feedlane fence within 2 hrs of putting out the feed or use a feed trough or other feeding structure designed to maintain feed within reach of the cows.	10%	10%
☒	☒	(D) Begin feeding total mixed rations within 2 hrs of grinding and mixing rations. <u>Note: If selected for dairies > 999 milk cows, control efficiency already included in EF.</u>	10%	0%
☒	☒	Feed steam-flaked, dry rolled, cracked or ground corn or other ground cereal grains.	10%	10%
☐	☐	Remove uneaten wet feed from feed bunks within 24 hrs after then end of a rain event.	0%	0%
☐	☐	(D) For total mixed rations that contain at least 30% by weight of silage, feed animals total mixed rations that contain at least 45% moisture.	0%	0%
☒	☒	Feed according to NRC guidelines. <u>Note: If selected for dairies, control efficiency already included in EF.</u>	0%	0%
Total Control Efficiency			27.10%	19.00%

Ammonia Mitigation Measures and Control Efficiencies

Milking Parlor				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	NH3 Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Milking Parlor Floor Mitigations		
☒	☒	Feed according to NRC guidelines	28%	28%
Total Control Efficiency			28%	28%

Cow Housing				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	NH3 Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Corrals/Pens Mitigations		
☒	☒	Feed according to NRC guidelines	28%	28%
☒	☒	Clean manure from corrals at least four times per year with at least 60 days between cleaning, or clean corrals at least once between April and July and at least once between September and December. OR Use lime or a similar absorbent material in the corral according to the manufacturer's recommendation to minimize moisture in the corrals. OR Apply thymol to the corral soil in accordance with the manufacturer's recommendation.	50%	50%
Total Control Efficiency			64%	64%
		Bedding Mitigations		
☒	☒	Feed according to NRC guidelines	28%	28%
☐	☐	Use non-manure-based bedding and non-separated solids based bedding for at least 90% of the bedding material, by weight, for freestalls (e.g. rubber mats, almond shells, sand, or waterbeds). OR For a large dairy only (1,000 milk cows or larger) - Remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every 7 days. OR For a medium dairy only (500 to 999 milk cows) - Remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every 14 days.	0.0%	0.0%
Total Control Efficiency			28.00%	28.00%
		Lanes Mitigations		
☒	☒	Feed according to NRC guidelines	28%	28%
Total Control Efficiency			28%	28%

Liquid Manure Handling				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	NH3 Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Lagoons/Storage Ponds Mitigations		
☒	☒	Feed according to NRC guidelines	28%	28%
☒	☒	Use phototropic lagoon OR Remove solids from the waste system with a solid separator system, prior to the waste entering the lagoon.	80%	80%
Total Control Efficiency			85.6%	85.6%
		Liquid Manure Land Application Mitigations		
☒	☒	Feed according to NRC guidelines	28%	28%
☐	☒	Only apply liquid manure that has been treated with an anaerobic treatment lagoon	0%	42%
Total Control Efficiency			28.00%	58.24%

Solid Manure Handling				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	NH3 Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
		Solid Manure Land Application Mitigations		
☒	☒	Feed according to NRC guidelines	28%	28%
☐	☐	Incorporate all solid manure within 72 hours of land application. AND Only apply solid manure that has been treated with an anaerobic treatment lagoon, aerobic lagoon or digester system. AND Apply no solid manure with a moisture content of more than 50%	0%	0%
Total Control Efficiency			28.00%	28.00%

Dairy Emission Factors

			lb/hd-yr Dairy Emissions Factors for Holstein Cows																												
			Milk Cows				Dry Cows				Large Heifers (15 to 24 months)				Medium Heifers (7 to 14 months)				Small Heifers (3 to 6 months)				Calves (0 - 3 months)				Bulls				
			Uncontrolled		Controlled		Uncontrolled		Controlled		Uncontrolled		Controlled		Uncontrolled		Controlled		Uncontrolled		Controlled		Uncontrolled		Controlled		Uncontrolled		Controlled		
		<1000 milk cows	>1000 milk cows	EF1	EF2	<1000 milk cows	>1000 milk cows	EF1	EF2	<1000 milk cows	>1000 milk cows	EF1	EF2	<1000 milk cows	>1000 milk cows	EF1	EF2	<1000 milk cows	>1000 milk cows	EF1	EF2	<1000 milk cows	>1000 milk cows	EF1	EF2	<1000 milk cows	>1000 milk cows	EF1	EF2		
Milking Parlor	VOC	Enteric Emissions in Milking Parlors	0.43	0.41	0.39	0.37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		Milking Parlor Floor	0.04	0.03	0.03	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		Total	0.47	0.44	0.42	0.40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	NH3	Total	0.19	0.19	0.14	0.14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Cow Housing	VOC	Enteric Emissions in Cow Housing	3.89	3.69	3.50	3.32	2.33	2.23	2.10	2.01	1.81	1.71	1.63	1.54	1.23	1.17	1.11	1.05	0.69	0.65	0.62	0.58	0.32	0.31	0.29	0.28	1.10	1.04	0.99	0.94	
		Corrals/Pens	10.00	6.60	4.30	4.57	5.40	3.59	2.32	2.49	4.20	2.76	1.81	1.91	2.85	1.88	1.23	1.30	1.60	1.04	0.69	0.72	0.75	0.50	0.32	0.35	2.55	1.67	1.10	1.16	
		Bedding	1.05	1.00	0.85	0.81	0.57	0.54	0.46	0.44	0.44	0.42	0.36	0.34	0.30	0.28	0.24	0.23	0.17	0.16	0.14	0.13	0.08	0.08	0.06	0.06	0.27	0.25	0.22	0.20	
		Lanes	0.84	0.80	0.68	0.65	0.45	0.44	0.37	0.35	0.35	0.33	0.29	0.27	0.24	0.23	0.19	0.18	0.13	0.13	0.11	0.10	0.06	0.06	0.05	0.05	0.21	0.20	0.17	0.16	
		Total	15.78	12.09	9.33	9.35	8.75	6.80	5.25	5.29	6.81	5.22	4.08	4.06	4.62	3.56	2.77	2.77	2.59	1.98	1.56	1.54	1.22	0.95	0.73	0.74	4.13	3.16	2.48	2.46	
	NH3	Enteric Emissions in Cow Housing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		Corrals/Pens	41.90	41.90	15.08	15.08	21.20	21.20	7.63	7.63	11.00	11.00	3.96	3.96	7.90	7.90	2.84	2.84	6.00	6.00	2.16	2.16	1.80	1.80	0.65	0.65	15.30	15.30	5.51	5.51	
		Bedding	6.30	6.30	4.54	4.54	3.20	3.20	2.30	2.30	1.70	1.70	1.22	1.22	1.20	1.20	0.86	0.86	0.90	0.90	0.65	0.65	0.30	0.30	0.22	0.22	2.30	2.30	1.66	1.66	
		Lanes	5.10	5.10	3.67	3.67	2.60	2.60	1.87	1.87	1.30	1.30	0.94	0.94	1.00	1.00	0.72	0.72	0.70	0.70	0.50	0.50	0.20	0.20	0.14	0.14	1.90	1.90	1.37	1.37	
		Total	53.30	53.30	23.29	23.29	27.00	27.00	11.81	11.81	14.00	14.00	6.12	6.12	10.10	10.10	4.43	4.43	7.60	7.60	3.31	3.31	2.30	2.30	1.01	1.01	19.50	19.50	8.53	8.53	
Liquid Manure Handling	VOC	Lagoons/Storage Ponds	1.52	1.30	1.23	0.70	0.82	0.71	0.66	0.38	0.64	0.54	0.52	0.29	0.43	0.37	0.35	0.20	0.24	0.21	0.20	0.11	0.11	0.10	0.09	0.05	0.40	0.33	0.32	0.18	
		Liquid Manure Land Application	1.64	1.40	1.33	0.76	0.89	0.76	0.72	0.41	0.69	0.58	0.56	0.32	0.47	0.40	0.38	0.22	0.26	0.22	0.21	0.12	0.12	0.11	0.10	0.06	0.42	0.35	0.34	0.19	
		Total	3.16	2.70	2.56	1.46	1.71	1.47	1.38	0.79	1.33	1.13	1.08	0.61	0.90	0.77	0.73	0.42	0.51	0.43	0.41	0.23	0.24	0.21	0.19	0.11	0.82	0.68	0.66	0.37	
	NH3	Lagoons/Storage Ponds	8.20	8.20	1.18	1.18	4.20	4.20	0.60	0.60	2.20	2.20	0.32	0.32	1.50	1.50	0.22	0.22	1.20	1.20	0.17	0.17	0.35	0.35	0.05	0.05	3.00	3.00	0.43	0.43	
Solid Manure Handling	VOC	Liquid Manure Land Application	8.90	8.90	6.41	3.72	4.50	4.50	3.24	1.88	2.30	2.30	1.66	0.96	1.70	1.70	1.22	0.71	1.30	1.30	0.94	0.54	0.37	0.37	0.27	0.15	3.23	3.23	2.33	1.35	
		Total	17.10	17.10	7.59	4.90	8.70	8.70	3.84	2.48	4.50	4.50	1.97	1.28	3.20	3.20	1.44	0.93	2.50	2.50	1.11	0.72	0.72	0.72	0.32	0.20	6.23	6.23	2.76	1.78	
		Solid Manure Storage	0.16	0.15	0.14	0.12	0.09	0.08	0.08	0.07	0.07	0.06	0.06	0.05	0.05	0.04	0.04	0.03	0.03	0.03	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.04	0.04	0.04	0.03
		Separated Solids Piles	0.06	0.06	0.05	0.05	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02	
		Solid Manure Land Application	0.39	0.33	0.32	0.18	0.21	0.18	0.17	0.10	0.16	0.14	0.13	0.07	0.11	0.09	0.09	0.05	0.06	0.05	0.05	0.03	0.03	0.03	0.02	0.01	0.10	0.08	0.08	0.04	
		Total	0.61	0.54	0.51	0.35	0.33	0.29	0.28	0.19	0.26	0.23	0.22	0.15	0.17	0.15	0.15	0.10	0.10	0.09	0.08	0.06	0.05	0.04	0.04	0.03	0.16	0.14	0.14	0.09	
	NH3	Solid Manure Storage	0.95	0.95	0.95	0.95	0.48	0.48	0.48	0.48	0.25	0.25	0.25	0.25	0.18	0.18	0.18	0.18	0.13	0.13	0.13	0.13	0.04	0.04	0.04	0.04	0.35	0.35	0.35	0.35	
		Separated Solids Piles	0.38	0.38	0.38	0.38	0.19	0.19	0.19	0.19	0.10	0.10	0.10	0.10	0.07	0.07	0.07	0.07	0.05	0.05	0.05	0.05	0.02	0.02	0.02	0.02	0.14	0.14	0.14	0.14	
		Solid Manure Land Application	2.09	2.09	1.50	1.50	1.06	1.06	0.76	0.76	0.55	0.55	0.40	0.40	0.39	0.39	0.28	0.28	0.30	0.30	0.22	0.22	0.09	0.09	0.06	0.06	0.76	0.76	0.55	0.55	
		Total	3.42	3.42	2.83	2.83	1.73	1.73	1.43	1.43	0.90	0.90	0.75	0.75	0.64	0.64	0.53	0.53	0.48	0.48	0.40	0.40	0.15	0.15	0.12	0.12	1.25	1.25	1.04	1.04	

Silage and TMR (Total Mixed Ration) Emissions (µg/m^2-min)					
Feed Storage and Handling	VOC	Silage Type	Uncontrolled	EF1	EF2
		Corn Silage	34,681	21,155	21,155
		Alfalfa Silage	17,458	10,649	10,649
		Wheat Silage	43,844	26,745	26,745
		TMR	13,056	9,518	10,575

Assumptions: 1) Each silage pile is completely covered except for the front face and 2) Rations are fed within 48 hours.

PM ₁₀ Emission Factors (lb/hd-yr)		
Type of Cow	Dairy EF	Source
Cows in Freestalls	1.37	Based on a Summer 2003 study by Texas A&M ASAE at a West Texas Dairy
Milk/Dry in Loafing Barns	2.73	SJVAPCD
Heifers/Bulls in Loafing Barns	5.28	SJVAPCD
Calves in Loafing Barns	0.69	SJVAPCD
Milk/Dry in Corrals	5.46	Based on a Summer 2003 study by Texas A&M ASAE at a West Texas Dairy
Support Stock (Heifers/Bulls) in Open Corrals	10.55	Based on a USDA/UC Davis report quantifying dairy and feedlot emissions in Tulare & Kern Counties (April '01)
Large Heifers in Open Corrals	8.01	SJVAPCD
Calf (under 3 mo.) open corrals	1.37	SJVAPCD
Calf on-ground hutches	0.343	SJVAPCD
Calf above-ground flushed	0.069	SJVAPCD
Calf above-ground scraped	0.206	SJVAPCD

The controlled PM10 EF will be calculated based on the specific PM10 mitigation measures, if any, for each freestall, corral, or calf hutch area. See the PM Mitigation Measures for calculations.

Dairy Emission Factors

Note: Jersey cows will be assumed to generate 71% of the amount of VOC and NH3 emissions as a Holstein cow.			lb/hd-yr Dairy Emissions Factors for Jersey Cows																												
			Milk Cows				Dry Cows				Large Heifers (15 to 24 months)				Medium Heifers (7 to 14 months)				Small Heifers (3 to 6 months)				Calves (0 - 3 months)				Bulls				
			Uncontrolled		Controlled		Uncontrolled		Controlled		Uncontrolled		Controlled		Uncontrolled		Controlled		Uncontrolled		Controlled		Uncontrolled		Controlled		Uncontrolled		Controlled		
			<1000 milk cows	>1000 milk cows	EF1	EF2	<1000 milk cows	>1000 milk cows	EF1	EF2	<1000 milk cows	>1000 milk cows	EF1	EF2	<1000 milk cows	>1000 milk cows	EF1	EF2	<1000 milk cows	>1000 milk cows	EF1	EF2	<1000 milk cows	>1000 milk cows	EF1	EF2	<1000 milk cows	>1000 milk cows	EF1	EF2	
Milking Parlor	VOC	Enteric Emissions in Milking Parlors	0.31	0.29	0.28	0.26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		Milking Parlor Floor	0.03	0.02	0.02	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		Total	0.34	0.31	0.30	0.28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
NH3	Total	0.13	0.13	0.10	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	VOC	Enteric Emissions in Cow Housing	2.76	2.62	2.48	2.36	1.66	1.58	1.49	1.43	1.29	1.22	1.16	1.09	0.87	0.83	0.79	0.75	0.49	0.46	0.44	0.41	0.23	0.22	0.21	0.20	0.78	0.74	0.70	0.66	
		Corrals/Pens	7.10	4.69	3.06	3.25	3.83	2.55	1.65	1.77	2.98	1.96	1.28	1.36	2.02	1.33	0.87	0.92	1.14	0.74	0.49	0.51	0.53	0.36	0.23	0.25	1.81	1.19	0.78	0.82	
Bedding		0.75	0.71	0.60	0.58	0.40	0.39	0.33	0.31	0.31	0.30	0.25	0.24	0.21	0.20	0.17	0.16	0.12	0.11	0.10	0.09	0.06	0.05	0.05	0.04	0.19	0.18	0.16	0.14		
Lanes		0.60	0.57	0.48	0.46	0.32	0.31	0.26	0.25	0.25	0.24	0.20	0.19	0.17	0.16	0.14	0.13	0.10	0.09	0.08	0.07	0.04	0.04	0.04	0.03	0.15	0.14	0.12	0.12		
Total		11.20	8.58	6.63	6.64	6.21	4.83	3.73	3.76	4.83	3.71	2.90	2.88	3.28	2.53	1.97	1.97	1.84	1.40	1.10	1.09	0.86	0.67	0.52	0.52	2.93	2.24	1.76	1.74		
NH3		Enteric Emissions in Cow Housing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Corrals/Pens	29.75	29.75	10.71	10.71	15.05	15.05	5.42	5.42	7.81	7.81	2.81	2.81	5.61	5.61	2.02	2.02	4.26	4.26	1.53	1.53	1.28	1.28	0.46	0.46	10.86	10.86	3.91	3.91		
	Bedding	4.47	4.47	3.22	3.22	2.27	2.27	1.64	1.64	1.21	1.21	0.87	0.87	0.85	0.85	0.61	0.61	0.64	0.64	0.46	0.46	0.21	0.21	0.15	0.15	1.63	1.63	1.18	1.18		
	Lanes	3.62	3.62	2.61	2.61	1.85	1.85	1.33	1.33	0.92	0.92	0.66	0.66	0.71	0.71	0.51	0.51	0.50	0.50	0.36	0.36	0.14	0.14	0.10	0.10	1.35	1.35	0.97	0.97		
	Total	37.84	37.84	16.54	16.54	19.17	19.17	8.38	8.38	9.94	9.94	4.35	4.35	7.17	7.17	3.14	3.14	5.40	5.40	2.35	2.35	1.63	1.63	0.72	0.72	13.85	13.85	6.06	6.06		
	Liquid Manure Handling	VOC	Lagoons/Storage Ponds	1.08	0.92	0.87	0.50	0.58	0.50	0.47	0.27	0.45	0.39	0.37	0.21	0.31	0.26	0.25	0.14	0.17	0.15	0.14	0.08	0.08	0.07	0.07	0.04	0.28	0.23	0.23	0.13
Liquid Manure Land Application			1.16	0.99	0.94	0.54	0.63	0.54	0.51	0.29	0.49	0.42	0.40	0.22	0.33	0.28	0.27	0.15	0.19	0.16	0.15	0.08	0.09	0.08	0.07	0.04	0.30	0.25	0.24	0.13	
Total			2.24	1.92	1.82	1.04	1.21	1.04	0.98	0.56	0.94	0.80	0.76	0.43	0.64	0.55	0.52	0.29	0.36	0.30	0.29	0.16	0.17	0.15	0.14	0.08	0.58	0.48	0.47	0.26	
NH3		Lagoons/Storage Ponds	5.82	5.82	0.84	0.84	2.98	2.98	0.43	0.43	1.56	1.56	0.22	0.22	1.07	1.07	0.15	0.15	0.85	0.85	0.12	0.12	0.25	0.25	0.04	0.04	2.13	2.13	0.31	0.31	
	Liquid Manure Land Application	6.32	6.32	4.55	2.64	3.20	3.20	2.30	1.33	1.63	1.63	1.18	0.68	1.21	1.21	0.87	0.50	0.92	0.92	0.66	0.39	0.26	0.26	0.19	0.11	2.29	2.29	1.65	0.96		
	Total	12.14	12.14	5.39	3.48	6.18	6.18	2.73	1.76	3.20	3.20	1.40	0.91	2.27	2.27	1.02	0.66	1.78	1.78	0.79	0.51	0.51	0.51	0.22	0.15	4.42	4.42	1.96	1.26		
Solid Manure Handling	VOC	Solid Manure Storage	0.11	0.11	0.10	0.09	0.06	0.06	0.06	0.05	0.05	0.04	0.04	0.04	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.03	0.03	0.03	0.02	
		Separated Solids Piles	0.04	0.04	0.04	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01		
		Solid Manure Land Application	0.28	0.23	0.22	0.13	0.15	0.13	0.12	0.07	0.12	0.10	0.09	0.05	0.08	0.07	0.06	0.04	0.04	0.04	0.04	0.02	0.02	0.02	0.02	0.01	0.07	0.06	0.06	0.03	
		Total	0.43	0.38	0.36	0.24	0.23	0.21	0.20	0.13	0.18	0.16	0.15	0.10	0.12	0.11	0.10	0.07	0.07	0.06	0.06	0.04	0.03	0.03	0.03	0.03	0.02	0.11	0.10	0.10	0.07
		Solid Manure Storage	0.67	0.67	0.67	0.67	0.34	0.34	0.34	0.34	0.18	0.18	0.18	0.18	0.13	0.13	0.13	0.13	0.09	0.09	0.09	0.09	0.03	0.03	0.03	0.03	0.25	0.25	0.25	0.25	
	NH3	Separated Solids Piles	0.27	0.27	0.27	0.27	0.13	0.13	0.13	0.13	0.07	0.07	0.07	0.07	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.01	0.01	0.01	0.01	0.10	0.10	0.10	0.10	
Solid Manure Land Application		1.48	1.48	1.07	1.07	0.75	0.75	0.54	0.54	0.39	0.39	0.28	0.28	0.28	0.28	0.20	0.20	0.21	0.21	0.15	0.15	0.06	0.06	0.05	0.05	0.54	0.54	0.39	0.39		
Total		2.43	2.43	2.01	2.01	1.23	1.23	1.02	1.02	0.64	0.64	0.53	0.53	0.45	0.45	0.38	0.38	0.34	0.34	0.28	0.28	0.11	0.11	0.09	0.09	0.89	0.89	0.74	0.74		

Silage and TMR (Total Mixed Ration) Emissions (µg/m^2-min)					
Feed Storage and Handling	VOC	Silage Type	Uncontrolled	EF1	EF2
		Corn Silage	34,681	21,155	21,155
		Alfalfa Silage	17,458	10,649	10,649
		Wheat Silage	43,844	26,745	26,745
		TMR	13,056	9,518	10,575

Assumptions: 1) Each silage pile is completely covered except for the front face and 2) Rations are fed within 48 hours.

PM ₁₀ Emission Factors (lb/hd-yr)		
Type of Cow	Dairy EF	Source
Cows in Freestalls	1.37	Based on a Summer 2003 study by Texas A&M ASAE at a West Texas Dairy
Milk/Dry in Loafing Barns	2.73	SJVAPCD
Heifers/Bulls in Loafing Barns	5.28	SJVAPCD
Calves in Loafing Barns	0.69	SJVAPCD
Milk/Dry in Corrals	5.46	Based on a Summer 2003 study by Texas A&M ASAE at a West Texas Dairy
Support Stock (Heifers/Bulls) in Open Corrals	10.55	Based on a USDA/UC Davis report quantifying dairy and feedlot emissions in Tulare & Kern Counties (April '01)
Large Heifers in Open Corrals	8.01	SJVAPCD
Calf (under 3 mo.) open corrals	1.37	SJVAPCD
Calf on-ground hutches	0.343	SJVAPCD
Calf above-ground flushed	0.069	SJVAPCD
Calf above-ground scraped	0.206	SJVAPCD

The controlled PM10 EF will be calculated based on the specific PM10 mitigation measures, if any, for each freestall, corral, or calf hutch area. See the PM Mitigation Measures for calculations.

Control Measure	PM10 Control Efficiency
Shaded corrals (milk and dry cows)	16.7%
Shaded corrals (heifers and bulls)	8.3%
Downwind shelterbelts	12.5%
Upwind shelterbelts	10%
Freestall with no exercise pens and non-manure based bedding	90%
Freestall with no exercise pens and manure based bedding	80%
Fibrous layer in dusty areas (i.e. hay, etc.)	10%
Bi-weekly corral/exercise pen scraping and/or manure removal using a pull type manure harvesting equipment in morning hours when moisture in air except during periods of rainy weather	15%
Sprinkling of open corrals/exercise pens	12.5%
Feeding young stock (heifers and calves) near dusk	10%

Pre-Project PM10 Mitigation Measures														
Housing Name(s) or #(s)	Type of Housing	Type of cow	Total # of cows in Each Housing Structure(s)	Maximum Design Capacity of Each Structure	# of Combined Housing Structures in row	Shaded Corrals	Downwind Shelterbelts	Upwind Shelterbelts	No exercise pens, non-manure bedding	No exercise pens, manure bedding	Fibrous layer	Bi-weekly scraping Corrals/Pens	Sprinkling Corrals/Pens	Feed Young Stock Near Dusk
Freestall Barn 3a	freestall	milk cows	500	500		☐	☐	☐	☐	☐	☐	☒	☐	☐
Freestall Barn 3b	freestall	dry cows	130	130		☐	☐	☐	☐	☐	☐	☒	☐	☐
Freestall Barn 4	freestall	milk cows	410	410		☐	☐	☐	☐	☐	☐	☒	☐	☐
Corral 1 & 2	open corral	support stock	290	290		☐	☐	☐	☐	☐	☐	☒	☐	☐
Corral 3	open corral	support stock	145	145		☐	☐	☐	☐	☐	☐	☒	☐	☐
Corral 4 thru 8	open corral	support stock	311	311		☐	☐	☐	☐	☐	☐	☒	☐	☐
Calf Hutches	aboveground scraped hutches	calves	155	155		☐	☐	☐	☐	☐	☐	☐	☐	☐
Pre-Project Total # of Cows			1,941			1								

Pre-Project PM10 Control Efficiencies and Emission Factors																
	Housing Name(s) or #(s)	Type of Housing	Type of cow	Total # of cows in Each Housing Structure(s)	Maximum Design Capacity of Each Structure	Uncontrolled EF (lb/hd-yr)	Shaded Corrals	Downwind Shelterbelts	Upwind Shelterbelts	No exercise pens, non-manure bedding	No exercise pens, manure bedding	Fibrous layer	Bi-weekly scraping Corrals/Pens	Sprinkling Corrals/Pens	Feed Young Stock Near Dusk	Controlled EF (lb/hd-yr)
1	Freestall Barn 3a	freestall	milk cows	500	500	1.370							15%			1.17
2	Freestall Barn 3b	freestall	dry cows	130	130	1.370							15%			1.17
3	Freestall Barn 4	freestall	milk cows	410	410	1.370							15%			1.17
4	Corral 1 & 2	open corral	support stock	290	290	10.550							15%			8.97
5	Corral 3	open corral	support stock	145	145	10.550							15%			8.97
6	Corral 4 thru 8	open corral	support stock	311	311	10.550							15%			8.97
7	Calf Hutches	aboveground scraped hutches	calves	155	155	0.206										0.21
Pre-Project Total # of Cows				1,941												

Post-Project PM10 Mitigation Measures

Post-Project PM10 Mitigation Measures															
	Housing Name(s) or #(s)	Type of Housing	Type of cow	Total # of cows in Each Housing Structure(s)	Maximum Design Capacity of <u>Each</u> Structure	# of Combined Housing Structures in row	Shaded Corrals	Downwind Shelterbelts	Upwind Shelterbelts	No exercise pens, non-manure bedding	No exercise pens, manure bedding	Fibrous layer	Bi-weekly scraping Corrals/Pens	Sprinkling Corrals/Pens	Feed Young Stock Near Dusk
1	Freestall Barn 3a	freestall	milk cows	500	500		☐	☒	☒	☐	☐	☐	☒	☐	☐
2	Freestall Barn 3b	freestall	milk cows	200	200		☐	☒	☒	☐	☐	☐	☒	☐	☐
3	Freestall Barn 4	freestall	milk cows	400	400		☐	☐	☐	☐	☐	☐	☒	☐	☐
4	Shade Barn 1a	loafing barn	dry cows	400	400		☒	☒	☒	☐	☐	☐	☒	☐	☐
5	Shade Barn 1b	loafing barn	support stock	180	180		☒	☒	☒	☐	☐	☐	☒	☐	☐
6	Shade Barn 2	loafing barn	support stock	945	945		☒	☒	☒	☐	☐	☐	☒	☐	☐
7	Calf Hutches	aboveground scraped hutches	calves	155	155		☐	☐	☐	☐	☐	☐	☐	☐	☐
Post-Project PM10 Mitigation Measures for New Housing Units at an Expanding Dairy															
	Housing Name(s) or #(s)	Type of Housing	Type of cow	Total # of cows in Each Housing Structure(s)	Maximum Design Capacity of <u>Each</u> Structure	# of Combined Housing Structures in row	Shaded Corrals	Downwind Shelterbelts	Upwind Shelterbelts	No exercise pens, non-manure bedding	No exercise pens, manure bedding	Fibrous layer	Bi-weekly scraping Corrals/Pens	Sprinkling Corrals/Pens	Feed Young Stock Near Dusk
1	Freestall Barn 5	freestall	milk cows	600	600		☐	☒	☒	☐	☐	☐	☒	☐	☐
2	Freestall Barn 6	freestall	milk cows	800	800		☐	☒	☒	☐	☐	☐	☒	☐	☐
3	Calf Hutches	aboveground scraped hutches	calves	220	220		☐	☐	☐	☐	☐	☐	☐	☐	☐
Post-Project Total # of Cows				4,400	(The post-project total includes dairy cows already on-site and new cows from the expansion.)										

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Pre-Project Potential to Emit - Cow Housing

Pre-Project Potential to Emit - Cow Housing												
	Housing Name(s) or #s)	Type of Cow	# of Cows	Controlled VOC EF (lb/hd-yr)	Controlled NH3 EF (lb/hd-yr)	Controlled PM10 EF (lb/hd-yr)	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
1	Freestall Barn 3a	milk cows	500	9.33	23.29	1.17	12.8	4,665	31.9	11,646	1.6	583
2	Freestall Barn 3b	dry cows	130	5.25	11.81	1.17	1.9	683	4.2	1,535	0.4	151
3	Freestall Barn 4	milk cows	410	9.33	23.29	1.17	10.5	3,825	26.2	9,550	1.3	478
4	Corral 1 & 2	support stock	290	4.08	6.12	8.97	3.2	1,183	4.9	1,775	7.1	2,601
5	Corral 3	support stock	145	4.08	6.12	8.97	1.6	592	2.4	887	3.6	1,300
6	Corral 4 thru 8	support stock	311	4.08	6.12	8.97	3.5	1,269	5.2	1,903	7.6	2,789
7	Calf Hutches	calves	155	0.73	1.01	0.21	0.3	113	0.4	156	0.1	32
Pre-Project Total # of Cows			1,941				33.8	12,330	75.2	27,452	21.7	7,934

*Multiple emissions units (freestalls, corrals, calf hutch areas, etc.) are combined in these rows.

Pre-Project Totals						
Total # of Cows	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
1,941	33.8	12,330	75.2	27,452	21.7	7,934

Calculations:

Annual PE 1 for each pollutant (lb/yr) = Controlled EF (lb/hd-yr) x # of cows (hd)

Daily PE1 for each pollutant (lb/day) = [Controlled EF (lb/hd-yr) x # of cows (hd)] ÷ 365 (day/yr)

Post-Project Potential to Emit - Cow Housing

Post-Project Potential to Emit - Cow Housing												
	Housing Name(s) or #s)	Type of Cow	# of Cows	Controlled VOC EF (lb/hd-yr)	Controlled NH3 EF (lb/hd-yr)	Controlled PM10 EF (lb/hd-yr)	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
1	Freestall Barn 3a	milk cows	500	9.35	23.29	0.92	12.8	4,675	31.9	11,646	1.3	459
2	Freestall Barn 3b	milk cows	200	9.35	23.29	0.92	5.1	1,870	12.8	4,658	0.5	183
3	Freestall Barn 4	milk cows	400	9.35	23.29	1.17	10.2	3,740	25.5	9,317	1.3	466
4	Shade Barn 1a	dry cows	400	5.29	11.81	1.83	5.8	2,116	12.9	4,723	2.0	731
5	Shade Barn 1b	support stock	180	4.06	6.12	3.53	2.0	731	3.0	1,102	1.7	636
6	Shade Barn 2	support stock	945	4.06	6.12	3.53	10.5	3,837	15.8	5,783	9.2	3,340
7	Calf Hutches	calves	155	0.74	1.01	0.21	0.3	115	0.4	156	0.1	32
Post-Project # of Cows (non-expansion)				2,780			46.7	17,084	102.3	37,385	16.1	5,847

*Multiple emissions units (freestalls, corrals, calf hutch areas, etc.) are combined in these rows.

Post-Project Potential to Emit - Cow Housing: New Housing Units at an Expanding Dairy												
	Housing Name(s) or #s)	Type of Cow	# of Cows	Controlled VOC EF (lb/hd-yr)	Controlled NH3 EF (lb/hd-yr)	Controlled PM10 EF (lb/hd-yr)	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
1	Freestall Barn 5	milk cows	600	9.35	23.29	0.92	15.4	5,610	38.3	13,975	1.5	550
2	Freestall Barn 6	milk cows	800	9.35	23.29	0.92	20.5	7,480	51.1	18,634	2.0	734
3	Calf Hutches	calves	220	0.74	1.01	0.21	0.4	163	0.6	222	0.1	45
Total # of Cows From Expansion			1,620				36.3	13,253	90.0	32,831	3.6	1,329

*Multiple emissions units (freestalls, corrals, calf hutch areas, etc.) are combined in these rows.

Post-Project Totals						
Total # of Cows	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
4,400	83.0	30,337	192.3	70,216	19.7	7,176

Calculations:

Annual PE 2 for each pollutant (lb/yr) = Controlled EF (lb/hd-yr) x # of cows (hd)

Daily PE2 for each pollutant (lb/day) = [Controlled EF (lb/hd-yr) x # of cows (hd)] ÷ 365 (day/yr)

Pre-Project Potential to Emit (PE1)

Pre-Project Herd Size							
Herd	Flushed Freestalls	Scraped Freestalls	Flushed Corrals	Scraped Corrals	Total # of Animals		
Milk Cows	910	0	0	0	910		
Dry Cows	130	0	0	0	130		
Support Stock (Heifers, Calves and Bulls)	0	0	0	0	0		
Large Heifers	0	0	435	0	435		
Medium Heifers	0	0	234	0	234		
Small Heifers	0	0	77	0	77		
Bulls	0	0	0	0	0		
	Calf Hutches				Calf Corrals		Total # of Calves
	Aboveground Flushed	Aboveground Scraped	On-Ground Flushed	On-Ground Scraped	Flushed	Scraped	
Calves	0	155	0	0	0	0	155

Silage Information				
Feed Type	Maximum # Open Piles	Maximum Height (ft)	Maximum Width (ft)	Open Face Area (ft^2)
Corn	1	20	150	2,135
Alfalfa	0	0	0	0
Wheat	1	20	150	2,135

Milking Parlor				
Cow	VOC		NH3	
	lb/day	lb/yr	lb/day	lb/yr
Milk Cows	1.0	382	0.3	124

Cow Housing					
Cow	VOC		NH3		PM10
	lb/day	lb/yr	lb/day	lb/yr	lb/day
Total	33.8	12,330	75.2	27,452	21.7

Liquid Manure Handling						
Cow	VOC		NH3		H2S*	
	lb/day	lb/yr	lb/day	lb/yr	lb/day	lb/yr
Milk Cows	6.4	2,330	18.9	6,907	0.8	295
Dry Cows	0.5	179	1.4	499	0.1	24
Support Stock (Heifers, Calves and Bulls)	0.0	0	0.0	0	0	0
Large Heifers	1.3	470	2.3	857	0	12
Medium Heifers	0.5	171	0.9	337	0	8
Small Heifers	0.1	32	0.2	85	0	6
Calves	0.1	29	0.1	50	0	2
Bulls	0.0	0	0.0	0	0	0
Total	8.9	3,211	23.8	8,735	0.9	348

Solid Manure Handling				
Cow	VOC		NH3	
	lb/day	lb/yr	lb/day	lb/yr
Milk Cows	1.3	464	7.1	2,575
Dry Cows	0.1	36	0.5	186
Support Stock (Heifers, Calves and Bulls)	0.0	0	0.0	0
Large Heifers	0.3	96	0.9	326
Medium Heifers	0.1	35	0.3	124
Small Heifers	0.0	6	0.1	31
Calves	0.0	6	0.1	19
Bulls	0.0	0	0.0	0
Total	1.8	644	9.0	3,261

Feed Handling and Storage		
	Daily PE (lb-VOC/day)	Annual PE (lb-VOC/yr)
Corn Emissions	13.3	4,852
Alfalfa Emissions	0.0	0
Wheat Emissions	16.8	6,135
TMR	35.4	12,934
Total	65.5	23,921

Total Daily Pre-Project Potential to Emit (lb/day)							
Permit	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0.0	0.0	0.0	0.0	1.0	0.3	0.0
Cow Housing	0.0	0.0	21.7	0.0	33.8	75.2	0.0
Liquid Manure	0.0	0.0	0.0	0.0	8.9	23.8	0.9
Solid Manure	0.0	0.0	0.0	0.0	1.8	9.0	0.0
Feed Handling	0.0	0.0	0.0	0.0	65.5	0.0	0.0
Total	0.0	0.0	21.7	0.0	111.0	108.3	0.9

Total Annual Pre-Project Potential to Emit (lb/yr)							
Permit	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0	0	0	0	382	124	0
Cow Housing	0	0	7,934	0	12,330	27,452	0
Liquid Manure	0	0	0	0	3,211	8,735	348
Solid Manure	0	0	0	0	644	3,261	0
Feed Handling	0	0	0	0	23,921	0	0
Total	0	0	7,934	0	40,487	39,572	348

Calculations for milking parlor:

Annual PE = (# milk cows) x (EF1 lb-pollutant/hd-yr)

Daily PE = (Annual PE lb/yr) ÷ (365 day/yr)

Calculations for cow housing:

See detailed calculations under Cow Housing Calculations worksheet.

Calculations for liquid manure and solid manure handling:

Annual PE = [(# milk cows) x (EF1 lb-pollutant/hd-yr)] + [(# dry cows) x (EF1 lb-pollutant/hd-yr)] + [(# large heifers) x (EF1 lb-pollutant/hd-yr)] + [(# medium heifers) x (EF1 lb-pollutant/hd-yr)] + [(# small heifers) x (EF1 lb-pollutant/hd-yr)] + [(# calves) x (EF1 lb-pollutant/hd-yr)] + [(# bulls) x (EF1 lb-pollutant/hd-yr)]

Daily PE = (Annual PE lb/yr) ÷ (365 day/yr)

The H2S emission factor is assumed to be 10% of the NH3 lagoon/storage pond(s) emission factor, for each respective herd size.

Calculations for silage emissions:

Annual PE = (EF1) x (area ft²) x (0.0929 m²/ft²) x (8,760 hr/yr) x (60 min/hr) x 2.20E-9 lb/μg

Daily PE = (Annual PE lb/yr) ÷ (365 day/yr)

Calculation for TMR emissions:

Annual PE = (# cows) x (EF1) x (0.658 m²) x (525,600 min/yr) x (2.20E-9 lb/μg)

Daily PE = (Annual PE lb/yr) ÷ (365 day/yr)

Notes
Calves are not included in TMR calculation.

*Since there will be no change to the lagoons/storage ponds surface area, no change in H2S emissions is expected. Therefore, it will be assumed that PE1 for H2S emissions is equal to PE2 for H2S emissions.

Major Source Emissions (lb/yr)					
Permit	NOx	SOx	PM10	CO	VOC
Milk Parlor	0	0	0	0	0
Cow Housing	0	0	0	0	0
Liquid Manure	0	0	0	0	1,543
Solid Manure	0	0	0	0	0
Feed Handling	0	0	0	0	0
Total	0	0	0	0	1,543

Post-Project Potential to Emit (PE2)

Post-Project Herd Size							
Herd	Flushed Freestalls	Scraped Freestalls	Flushed Corrals	Scraped Corrals	Total # of Animals		
Milk Cows	2,500	0	0	0	2,500		
Dry Cows	0	0	400	0	400		
Support Stock (Heifers, Calves, and Bulls)	0	0	0	0	0		
Large Heifers	0	0	375	0	375		
Medium Heifers	0	0	375	0	375		
Small Heifers	0	0	375	0	375		
Bulls	0	0	0	0	0		
	Calf Hutches				Calf Corrals		Total # of Calves
	Aboveground Flushed	Aboveground Scraped	On-Ground Flushed	On-Ground Scraped	Flushed	Scraped	
	Calves	0	375	0	0	0	

Silage Information				
Feed Type	Maximum # Open Piles	Maximum Height (ft)	Maximum Width (ft)	Open Face Area (ft^2)
Corn	1	20	150	2,135
Alfalfa	0	0	0	0
Wheat	1	20	150	2,135

Milking Parlor				
Cow	VOC		NH3	
	lb/day	lb/yr	lb/day	lb/yr
Milk Cows				
Total	2.7	1,000	0.9	342

Cow Housing					
	VOC		NH3		PM10
	lb/day	lb/yr	lb/day	lb/yr	lb/day
Total	83.0	30,337	192	70,216	20

Liquid Manure Handling						
Cow	VOC		NH3		H2S	
	lb/day	lb/yr	lb/day	lb/yr	lb/day	lb/yr
Milk Cows	10.0	3,650	33.6	12,250	0.8	295
Dry Cows	0.9	316	2.7	992	0.1	24
Support Stock (Heifers, Calves, and Bulls)	0.0	0	0.0	0	0	0
Large Heifers	0.6	229	1.3	480	0	12
Medium Heifers	0.4	158	1.0	349	0	8
Small Heifers	0.2	86	0.7	270	0	6
Calves	0.1	41	0.2	75	0	2
Bulls	0.0	0	0.0	0	0	0
Total	12.2	4,480	39.5	14,416	0.9	348

Solid Manure Handling				
Cow	VOC		NH3	
	lb/day	lb/yr	lb/day	lb/yr
Milk Cows	2.4	875	19.4	7,075
Dry Cows	0.2	76	1.6	572
Support Stock (Heifers, Calves, and Bulls)	0.0	0	0.0	0
Large Heifers	0.2	56	0.8	281
Medium Heifers	0.1	38	0.5	199
Small Heifers	0.1	23	0.4	150
Calves	0.0	11	0.1	45
Bulls	0.0	0	0.0	0
Total	3.0	1,079	22.8	8,322

Feed Handling and Storage		
	Daily PE (lb-VOC/day)	Annual PE (lb-VOC/yr)
Corn Emissions	13.3	4,852
Alfalfa Emissions	0.0	0
Wheat Emissions	16.8	6,135
TMR	88.7	32,387
Total	118.8	43,374

Total Daily Post-Project Potential to Emit (lb/day)							
Permit	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0.0	0.0	0.0	0.0	2.7	0.9	0.0
Cow Housing	0.0	0.0	19.7	0.0	83.0	192.3	0.0
Liquid Manure	0.0	0.0	0.0	0.0	12.2	39.5	0.9
Solid Manure	0.0	0.0	0.0	0.0	3.0	22.8	0.0
Feed Handling	0.0	0.0	0.0	0.0	118.8	0.0	0.0
Total	0.0	0.0	19.7	0.0	219.7	255.5	0.9

Total Annual Post-Project Potential to Emit (lb/yr)							
Permit	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0	0	0	0	1,000	342	0
Cow Housing	0	0	7,176	0	30,337	70,216	0
Liquid Manure	0	0	0	0	4,480	14,416	348
Solid Manure	0	0	0	0	1,079	8,322	0
Feed Handling	0	0	0	0	43,374	0	0
Total	0	0	7,176	0	80,269	93,296	348

Calculations for milking parlor:

Annual PE = (# milk cows) x (EF2 lb-pollutant/hd-yr)

Daily PE = (Annual PE lb/yr) ÷ (365 day/yr)

Calculations for cow housing:

See detailed calculations under Cow Housing Calculations worksheet.

Calculations for liquid manure and solid manure handling:

Annual PE = [(# milk cows) x (EF1 lb-pollutant/hd-yr)] + [(# dry cows) x (EF2 lb-pollutant/hd-yr)] + [(# large heifers) x (EF2 lb-pollutant/hd-yr)] + [(# medium heifers) x (EF2 lb-pollutant/hd-yr)] + [(# small heifers) x (EF2 lb-pollutant/hd-yr)] + [(# calves) x (EF2 lb-pollutant/hd-yr)] + [(# bulls) x (EF2 lb-pollutant/hd-yr)]

Daily PE = (Annual PE lb/yr) ÷ (365 day/yr)

The H2S emission factor is assumed to be 10% of the NH3 lagoon/storage pond(s) emission factor, for each respective herd size.

Calculations for silage emissions:

Annual PE = (EF2) x (area ft²) x (0.0929 m²/ft²) x (8,760 hr/yr) x (60 min/hr) x 2.20E-9 lb/μg

Daily PE = (Annual PE lb/yr) ÷ (365 day/yr)

Calculation for TMR emissions:

Annual PE = (# cows) x (EF2) x (0.658 m²) x (525,600 min/yr) x (2.20E-9 lb/μg)

Daily PE = (Annual PE lb/yr) ÷ (365 day/yr)

Calves are not included in TMR calculation.

Major Source Emissions (lb/yr)					
Permit	NOx	SOx	PM10	CO	VOC
Milk Parlor	0	0	0	0	0
Cow Housing	0	0	0	0	0
Liquid Manure	0	0	0	0	2,147
Solid Manure	0	0	0	0	0
Feed Handling	0	0	0	0	0
Total	0	0	0	0	2,147

APPENDIX E

BACT Calculations

This table uses the worst case emission factor for each cow type and the maximum design capacity of the housing unit. This should only be used for BACT calculation purposes.

*Multiple emissions units (freestalls, corrals, calf hutch areas, etc.) are combined in these rows. BACT applicability has been calculated for EACH emissions unit in this row.

Calculations:

Annual PE 1 for each pollutant (lb/yr) = Controlled EF (lb/hd-yr) x # of cows (hd)

$$\text{Daily PE1 for each pollutant (lb/day)} = [\text{Controlled EF (lb/hd-yr)} \times \text{\# of cows (hd)}] \div 365 (\text{day/yr})$$

This table uses the worst case emission factor for each cow type and the maximum design capacity of the housing unit. This should only be used for BACT calculation purposes.

*Multiple emissions units (freestalls, corrals, calf hutch areas, etc.) are combined in these rows. BACT applicability has been calculated for EACH emissions unit in this row.

Calculations:

Annual PE 2 for each pollutant (lb/yr) = Controlled EF (lb/hd-yr) x # of cows (hd)

$$\text{Daily PE2 for each pollutant (lb/day)} = [\text{Controlled EF (lb/d-yr)} \times \text{\# of cows (hd)}] \div 365 \text{ (day/yr)}$$
[illegible]

9															
10															
11															
12															
13															
14															
						41.5	15,147	103.4	37,733	33.5	12,208				

*Multiple emissions units (freestalls, corrals, calf hutch areas, etc.) are combined in these rows. BACT applicability has been calculated for EACH emissions unit in this row.

Post-Project Totals					
VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
112.6	41,140	280.8	102,485	88.5	32,249

Calculations:

Annual PE 2 for each pollutant (lb/yr) = Controlled EF (lb/hd-yr) x # of cows (hd)
Daily PE2 for each pollutant (lb/day) = [Controlled EF (lb/hd-yr) x # of cows (hd)] ÷ 365 (day/yr)

BACT Applicability

Milking Parlor					
VOC Emissions					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	2.7	1.0	0.40	0.42	1.7
Total					1.7
NH3 Emissions					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	0.9	0.3	0.14	0.14	0.6
Total					0.6

Cow Housing					
See detailed cow housing AIPE calculations on the BACT Calcs page.					

Liquid Manure Handling					
VOC Emissions - Lagoon/Storage Pond(s)					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	4.8	3.1	0.70	1.23	3.0
Dry Cows	0.4	0.2	0.38	0.66	0.3
Support Stock (Heifers, Calves, and Bulls)	0.0	0.0	0.29	0.52	0.0
Large Heifers	0.3	0.6	0.29	0.52	0.0
Medium Heifers	0.2	0.2	0.20	0.35	0.1
Small Heifers	0.1	0.0	0.11	0.20	0.1
Calves	0.1	0.0	0.05	0.09	0.1
Bulls	0.0	0.0	0.18	0.32	0.0
BACT triggered for VOC for Lagoon/Storage Ponds					Total 3.6
VOC Emissions - Land Application					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	5.2	3.3	0.76	1.33	3.3
Dry Cows	0.5	0.3	0.41	0.72	0.3
Support Stock (Heifers, Calves, and Bulls)	0.0	0.0	0.32	0.56	0.0
Large Heifers	0.3	0.7	0.32	0.56	-0.1
Medium Heifers	0.2	0.2	0.22	0.38	0.1
Small Heifers	0.1	0.0	0.12	0.21	0.1
Calves	0.1	0.0	0.06	0.10	0.1
Bulls	0.0	0.0	0.19	0.34	0.0
BACT triggered for VOC for Liquid Manure Land Application					Total 3.8
NH3 Emissions - Lagoon/Storage Pond(s)					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	8.1	2.9	1.18	1.18	5.2
Dry Cows	0.7	0.2	0.60	0.60	0.5
Support Stock (Heifers, Calves, and Bulls)	0.0	0.0	0.32	0.32	0.0
Large Heifers	0.3	0.4	0.32	0.32	-0.1
Medium Heifers	0.2	0.1	0.22	0.22	0.1
Small Heifers	0.2	0.0	0.17	0.17	0.2
Calves	0.1	0.0	0.05	0.05	0.1
Bulls	0.0	0.0	0.43	0.43	0.0
BACT triggered for NH3 for Lagoon/Storage Ponds					Total 6.0
NH3 Emissions - Land Application					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	25.5	16.0	3.72	6.41	16.2
Dry Cows	2.1	1.2	1.88	3.24	1.4
Support Stock (Heifers, Calves, and Bulls)	0.0	0.0	0.96	1.66	0.0
Large Heifers	1.0	2.0	0.96	1.66	-0.2
Medium Heifers	0.7	0.8	0.71	1.22	0.2
Small Heifers	0.6	0.2	0.54	0.94	0.5
Calves	0.2	0.1	0.15	0.27	0.1
Bulls	0.0	0.0	1.35	2.33	0.0
BACT triggered for NH3 for Liquid Manure Land Application					Total 18.3
H2S Emissions - Lagoon/Storage Pond(s)					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	0.8	0.8	0.12	0.12	0.0
Dry Cows	0.1	0.1	0.06	0.06	0.0
Support Stock (Heifers, Calves, and Bulls)	0.0	0.0	0.03	0.03	0.0
Large Heifers	0.0	0.0	0.03	0.03	0.0
Medium Heifers	0.0	0.0	0.02	0.02	0.0
Small Heifers	0.0	0.0	0.02	0.02	0.0
Calves	0.0	0.0	0.01	0.01	0.0
Bulls	0.0	0.0	0.04	0.04	0.0
Total					0.0

Solid Manure Handling					
VOC Emissions - Solid Manure Storage/Separated Solids Piles					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	1.2	0.5	0.17	0.20	0.8
Dry Cows	0.1	0.0	0.09	0.11	0.1
Support Stock (Heifers, Calves, and Bulls)	0.0	0.0	0.10	0.08	0.0
Large Heifers	0.1	0.1	0.07	0.08	0.0
Medium Heifers	0.0	0.0	0.05	0.06	0.0
Small Heifers	0.0	0.0	0.03	0.03	0.0
Calves	0.0	0.0	0.01	0.01	0.0
Bulls	0.0	0.0	0.05	0.05	0.0
Total					0.9
VOC Emissions - Land Application					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	1.2	0.8	0.18	0.32	0.7
Dry Cows	0.1	0.1	0.10	0.17	0.0
Support Stock (Heifers, Calves, and Bulls)	0.0	0.0	0.07	0.13	0.0
Large Heifers	0.1	0.2	0.07	0.13	0.0
Medium Heifers	0.1	0.1	0.05	0.09	0.0
Small Heifers	0.0	0.0	0.03	0.05	0.0
Calves	0.0	0.0	0.01	0.02	0.0
Bulls	0.0	0.0	0.04	0.08	0.0
Total					0.8
NH3 Emissions - Solid Manure Storage/Separated Solids Piles					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	9.1	3.3	1.33	1.33	5.8
Dry Cows	0.7	0.2	0.67	0.67	0.5
Support Stock (Heifers, Calves, and Bulls)	0.0	0.0	0.35	0.35	0.0
Large Heifers	0.4	0.4	0.35	0.35	0.0
Medium Heifers	0.3	0.2	0.25	0.25	0.1
Small Heifers	0.2	0.0	0.18	0.18	0.2
Calves	0.1	0.0	0.06	0.06	0.1
Bulls	0.0	0.0	0.49	0.49	0.0
BACT triggered for NH3 for Solid Manure Storage					Total 6.7
NH3 Emissions - Land Application					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	10.3	3.8	1.50	1.50	6.5
Dry Cows	0.8	0.3	0.76	0.76	0.5
Support Stock (Heifers, Calves, and Bulls)	0.0	0.0	0.40	0.40	0.0
Large Heifers	0.4	0.5	0.40	0.40	-0.1
Medium Heifers	0.3	0.2	0.28	0.28	0.1
Small Heifers	0.2	0.0	0.22	0.22	0.2
Calves	0.1	0.0	0.06	0.06	0.1
Bulls	0.0	0.0	0.55	0.55	0.0
BACT triggered for NH3 for Solid Manure Land Application					Total 7.3

Feed Storage and Handling					
VOC Emissions - Silage					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Corn Silage	13.3	13.3	21,155	21,155	0.0
Alfalfa Silage	0.0	0.0	10,649	10,649	0.0
Wheat Silage	16.8	16.8	26,745	26,745	0.0
Total					0.0
VOC Emissions - TMR					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
TMR	88.7	35.4	10,575	9,518	53.3
BACT triggered for VOC for TMR					Total 53.3

APPENDIX F

BACT Guidelines

San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 5.8.2*

Last Update: 12/18/2013

Cow Housing - Freestall and Saudi-Style Barns

Pollutant	Achieved in Practice or contained in the SIP	Technologically Feasible	Alternate Basic Equipment
VOC	1) Concrete feed lanes and walkways; 2) Flushing the lanes and walkways for the mature cows (milk and dry cows) four times per day and flushing lanes and walkways for the remaining animals once per day (or for dairies that cannot use a flush system, Scraping lanes and walkways for mature cows with an automatic scraper (or equivalent) four times per day and cleaning lanes and walkways for support stock (heifers) at least once per day); 3) Feeding all animals in accordance with National Research Council (NRC) or other District-approved guidelines; 4) Properly sloping exercise pens (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal) or managing corrals to maintain a dry surface; 5) Scraping exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions; and 6) Rule 4570 Measures		
PM10	1) Concrete feed lanes and walkways; 2) Scraping exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions		

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NH3

- 1) Concrete feed lanes and walkways;
- 2) Flushing the lanes and walkways for the mature cows (milk and dry cows) four times per day and flushing lanes and walkways for the remaining animals once per day (or for dairies that cannot use a flush system, Scraping lanes and walkways for mature cows with an automatic scraper (or equivalent) four times per day and cleaning lanes and walkways for support stock (heifers) at least once per day);
- 3) Feeding all animals in accordance with National Research Council (NRC) or other District-approved guidelines;
- 4) Properly sloping exercise pens (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal) or managing corrals to maintain a dry surface; and
- 5) Scraping exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions;

BACT is the most stringent control technique for the emissions unit and class of source. Control techniques that are not achieved in practice or contained in a State Implementation Plan must be cost effective as well as feasible. Economic analysis to demonstrate cost effectiveness is required for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

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San Joaquin Valley
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Best Available Control Technology (BACT) Guideline 5.8.4*

Last Update: 3/17/2015

Cow Housing - Loafing Barns

Pollutant	Achieved in Practice or contained in the SIP	Technologically Feasible	Alternate Basic Equipment
VOC	1) Concrete feed lanes and walkways; 2) Flushing the lanes and walkways for the mature cows (milk and dry cows) four times per day and flushing lanes and walkways for the remaining animals once per day (or for dairies that cannot use a flush system, Scraping lanes and walkways for mature cows with an automatic scraper (or equivalent) four times per day and cleaning lanes and walkways for support stock (heifers) at least once per day); 3) Feeding all animals in accordance with National Research Council (NRC) or other District-approved guidelines; 4) Properly sloping corrals (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal) or managing corrals to maintain a dry surface; 5) Scraping pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions; and 6) Rule 4570 Measures		

San Joaquin Valley Unified Air Pollution Control District

PM10

1) Concrete feed lanes and walkways;

2) Scraping exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions;

3) Windbreaks controlling dust from corrals (when feasible, supported by soil conditions, and there is adequate space at existing facilities); or

4) An alternative measure with equivalent PM control (e.g. sprinkling/water application over at least 25% of the corral surface or average corral surface moisture content (wet-based) $\geq 16\%$) may be applied as a replacement for the previous measures

San Joaquin Valley Unified Air Pollution Control District

NH3

- 1) Concrete feed lanes and walkways;
- 2) Flushing the lanes and walkways for the mature cows (milk and dry cows) four times per day and flushing lanes and walkways for the remaining animals once per day (or for dairies that cannot use a flush system, Scraping lanes and walkways for mature cows with an automatic scraper (or equivalent) four times per day and cleaning lanes and walkways for support stock (heifers) at least once per day);
- 3) Feeding all animals in accordance with National Research Council (NRC) or other District-approved guidelines;
- 4) Properly sloping corrals (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal) or managing corrals to maintain a dry surface;
- 5) Scraping pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions.

BACT is the most stringent control technique for the emissions unit and class of source. Control techniques that are not achieved in practice or contained in a State Implementation Plan must be cost effective as well as feasible. Economic analysis to demonstrate cost effectiveness is required for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

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San Joaquin Valley
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Best Available Control Technology (BACT) Guideline 5.8.5*

Last Update: 12/18/2013

Cow Housing - Area for Baby Calves (0-3 months)

Pollutant	Achieved in Practice or contained in the SIP	Technologically Feasible	Alternate Basic Equipment
VOC	1) Flushing or scraping to remove manure from the cow housing areas for the baby calves at least once per week; and 2) Feeding baby dairy calves in accordance with National Research Council (NRC) or other District-approved guidelines		
PM10	Calf Hutches ($\geq 75\%$ Control)		
NH3	1) Flushing or scraping to remove manure from the cow housing areas for the baby calves at least once per week; and 2) Feeding baby dairy calves in accordance with National Research Council (NRC) or other District-approved guidelines		

BACT is the most stringent control technique for the emissions unit and class of source. Control techniques that are not achieved in practice or contained in a State Implementation Plan must be cost effective as well as feasible. Economic analysis to demonstrate cost effectiveness is required for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

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Best Available Control Technology (BACT) Guideline 5.8.6*

Last Update: 12/18/2013

Liquid Manure Handling - Lagoon/Storage Pond

Pollutant	Achieved in Practice or contained in the SIP	Technologically Feasible	Alternate Basic Equipment
VOC	Anaerobic treatment lagoon designed according to NRCS Guideline, and solids removal/separation system (mechanical separator(s) or settling basin(s)/weeping wall(s))	1) Aerobic treatment lagoon or mechanically aerated lagoon; 2) Covered lagoon digester vented to a control device with minimum 95% control	
NH3	All animals fed in accordance with NRCS or other District-approved guidelines		

BACT is the most stringent control technique for the emissions unit and class of source. Control techniques that are not achieved in practice or contained in a State Implementation Plan must be cost effective as well as feasible. Economic analysis to demonstrate cost effectiveness is required for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

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San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 5.8.7*

Last Update: 12/18/2013

Liquid Manure Handling - Liquid/Slurry Land Application

Pollutant	Achieved in Practice or contained in the SIP	Technologically Feasible	Alternate Basic Equipment
VOC	Irrigation of crops using liquid/slurry manure from the secondary lagoon/holding/storage pond preceded by an uncovered anaerobic treatment lagoon designed to meet Natural Resources Conservation Service (NRCS) standards	1) Irrigation of crops using liquid manure from an aerobic treatment lagoon or mechanically aerated lagoon (95% VOC control efficiency) 2) Irrigation of crops using liquid manure from a holding/storage pond after being treated in a covered lagoon/digester (80% VOC control efficiency)	
NH3	All animals fed in accordance with NRCS or other District-approved guidelines		

BACT is the most stringent control technique for the emissions unit and class of source. Control techniques that are not achieved in practice or contained in a State Implementation Plan must be cost effective as well as feasible. Economic analysis to demonstrate cost effectiveness is required for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

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San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 5.8.8*

Last Update: 12/18/2013

Solid Manure Handling - Storage/Separated Solids Piles

Pollutant	Achieved in Practice or contained in the SIP	Technologically Feasible	Alternate Basic Equipment
NH3	All animals fed in accordance with NRCS or other District-approved guidelines		

BACT is the most stringent control technique for the emissions unit and class of source. Control techniques that are not achieved in practice or contained in a State Implementation Plan must be cost effective as well as feasible. Economic analysis to demonstrate cost effectiveness is required for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

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San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 5.8.9*

Last Update: 12/18/2013

Solid Manure Handling - Land Application

Pollutant	Achieved in Practice or contained in the SIP	Technologically Feasible	Alternate Basic Equipment
VOC	Rapid incorporation of solid manure into the soil after land application	1a) Land Application of Solid Manure Processed by Either an Open or Enclosed Negatively-Aerated Static Pile (ASP) Vented to a biofilter (or equivalent) $\geq 80\%$ destruction efficiency With Rapid Incorporation of the Manure Into the Soil After Land Application; 1b) Land Application of Solid Manure Processed by In-Vessel/Enclosed Negatively-Aerated Static Piles vented to biofilter $\geq 80\%$ destruction efficiency; 2) Land Application of Solid Manure Processed by Open Negatively-Aerated Static Piles vented to biofilter $\geq 80\%$ destruction efficiency; 3) Land Application of Solid Manure Processed by an Open Negatively-Aerated Static Piles (ASP) (With Thick Layer of Bulking Agent or Equivalent) With Rapid Incorporation of the Manure Into the Soil After Land Application	
NH3	Rapid incorporation of solid manure into the soil after land application, and all animals fed in accordance with NRCS or other District-approved guidelines		

BACT is the most stringent control technique for the emissions unit and class of source. Control techniques that are not achieved in practice or contained in a State Implementation Plan must be cost effective as well as feasible. Economic analysis to demonstrate cost effectiveness is required for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

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San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 5.8.11*

Last Update: 12/18/2013

Feed Storage and Handling - Feed/TMR

Pollutant	Achieved in Practice or contained in the SIP	Technologically Feasible	Alternate Basic Equipment
VOC	District Rule 4570 Measures for Feed/TMR		

BACT is the most stringent control technique for the emissions unit and class of source. Control techniques that are not achieved in practice or contained in a State Implementation Plan must be cost effective as well as feasible. Economic analysis to demonstrate cost effectiveness is required for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

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APPENDIX G

Top-Down BACT Analysis

I. Top-Down BACT Analysis for Cow Housing (ATC Permit N-8441-2-1):

BACT Guideline 5.8.2 (Cow Housing – Freestall and Saudi-Style Barns) applies to the proposed cow housing freestall barns and BACT Guideline 5.8.4 (Cow Housing – Loafing Barns) applies to the proposed cow housing shade barns. In accordance with the District BACT policy, information from these guidelines will be utilized without further analysis.

1. BACT Analysis for VOC Emissions from Freestall Barns 5 and 6

Step 1 - Identify all control technologies

Achieved-In-Practice

- Concrete feed lanes and walkways;
- Flushing the feed lanes and walkways for the mature cows (milk and dry cows) four times per day and flushing feed lanes and walkways for the remaining animals once per day (or for dairies that cannot use a flush system, Scraping feed lanes and walkways for mature cows with an automatic scraper (or equivalent) four times per day and cleaning feed lanes and walkways for support stock (heifers) at least once per day);
- Feeding all animals in accordance with National Research Council (NRC) or other District-approved guidelines;
- Properly sloping corrals (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal) or managing corrals to maintain a dry surface;
- Scraping exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions; and
- District Rule 4570 Mitigation Measures.

Technologically Feasible:

None

Alternate Basic Equipment:

None

Description of Control Technologies:

Concrete feed lanes and walkways

Dairy cows spend a large proportion of time on the feed lanes and walkways. A significant proportion of manure is consequently deposited in these areas. The concrete lanes and walkways are necessary for an effective flush system, which in turn is a key component of management practices used for the control of VOC and ammonia emissions (see below).

Increased flushing of feed lanes and walkways

Many dairy operations use a flush system to remove manure from the feed lanes and walkways. The flush system introduces a large volume of water at the head of the paved area, and the cascading water carries the manure downslope. The required volume of flush water varies with the size and slope of the area to be flushed.

In addition to cleaning the feed lanes and walkways, the flush system also serves as an emissions control method. Many of the VOCs emitted from fresh cow manure, such as alcohols (ethanol and methanol) and many Volatile Fatty Acids (VFAs), are highly soluble in water. Therefore, a large proportion of these compounds will dissolve in the flush water instead of being emitted directly from the housing areas. The flush water then carries the manure and the dissolved volatile compounds into an anaerobic treatment system where they are digested and converted into less polluting byproducts by microbial activity.

Feed lanes and walkways are typically flushed once or twice per day in the mature cow housing areas; and as infrequently as once a week in the support stock housing areas. Flushing the lanes four times per day for mature cows and once per day for support stock will increase the frequency with which manure is removed from the housing areas, which should result in a higher percentage of soluble volatile compounds being captured in the flush water, and therefore higher control efficiency. Although the control efficiency may actually be much higher, increasing the cleaning frequency of the lanes will be conservatively assumed to have a control efficiency of 10% for VOCs emitted from manure in cow housing areas, until better data becomes available.

Feeding all animals in accordance with National Research Council (NRC) or other District-approved guidelines

Nutritional management of dairy feed is routinely practiced to improve milk production and herd health. The potential for VOC emissions can be reduced by reducing the quantity of undigested nutrients in the manure. Many of the VOCs emitted from Confined Animal Facilities, including dairies, originate from the decomposition of undigested protein in animal waste.¹⁴ This undigested protein also produces ammonia emissions. The level of microbial action in the manure corresponds to the level of organic nitrogen content in the manure; the lower the level of nitrogen the lower the level of microbial action and the lower the production of ammonia and VOCs.

A diet that is formulated to feed proper amounts of ruminantly degradable protein will result in improved nitrogen utilization by the animal and corresponding reduction in urea and organic nitrogen content of the manure, which will reduce the production of VOCs and ammonia. The latest National Research Council (NRC) guidelines for the selection of an optimal bovine diet should be followed to the maximum extent possible. The diet recommendations made in this publication seek to achieve the maximum uptake of protein by the animal and the minimum carryover of nutrients into the manure.

Based on very limited data (Klaunser, 1998, *J Prod Agric*), diet manipulation decreased nitrogen excretion by 34% while improving milk production. Up to 70% of excess nitrogen is lost off of the farm through volatilization, denitrification and leaching. Because of limited research, feeding cows in accordance with National Research Council (NRC) or other District-approved guidelines will be conservatively assumed to have a control efficiency of only 5-10% for both enteric¹⁵ and manure VOC emissions.

¹⁴ "Emissions of Volatile Organic Compounds Originating from UK Livestock Agriculture", Hobbs, P.J. 2004 - Journal of the Science of Food and Agriculture.

¹⁵ Enteric emissions are those emitted directly from the animal (primarily via belching and flatulence), due to feed digestion processes.

Properly sloping exercise pens/corrals

Accumulation of water on exercise pen/corral surfaces, due to rain or on-farm activities, could result in anaerobic conditions and thereby increase emissions. Keeping exercise pen/corral surfaces dry and properly aerated, on the other hand, promotes the aerobic conditions that reduce emissions. Proper slope design is therefore required to ensure that drainage of any water deposited on the exercise pen surfaces will be as rapid as possible.

Scraping of exercise pens/corrals with a pull-type scraper

Frequent scraping of the corrals will reduce the amount of manure on the pen/corral surfaces, which will reduce VOC and ammonia emissions resulting from decomposition of this manure. This practice will also provide a uniform surface that promotes aerobic conditions on the pen/corral surface, which will reduce gaseous pollutants from this area.

Step 2 – Eliminate Technologically Infeasible Options

There are no technologically infeasible options to eliminate from step 1.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

The only control technology that is identified above is the use of the above listed achieved-in-practice control methods, therefore ranking is not required.

Step 4 - Cost Effectiveness Analysis

The above listed control technology is achieved-in-practice; therefore a cost analysis is not required.

Step 5 - Select BACT

The most effective VOC control technology not eliminated in Steps 2 and 4 above is the following listed achieved-in-practice VOC control methods:

- Concrete feed lanes and walkways;
- Flushing the feed lanes and walkways for the mature cows (milk and dry cows) four times per day and flushing feed lanes and walkways for the remaining animals once per day (or for dairies that cannot use a flush system, Scraping feed lanes and walkways for mature cows with an automatic scraper (or equivalent) four times per day and cleaning feed lanes and walkways for support stock (heifers) at least once per day);
- Feeding all animals in accordance with National Research Council (NRC) or other District-approved guidelines;
- Properly sloping corrals (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal) or managing corrals to maintain a dry surface;
- Scraping exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions; and

- District Rule 4570 Mitigation Measures.

The applicant is proposing the use of the achieved-in-practice VOC control methods. Therefore, BACT for VOC is being proposed.

2. BACT Analysis for NH₃ Emissions from Freestall Barns 3, 5, and 6

Step 1 - Identify all control technologies

Achieved-In-Practice

- Concrete feed lanes and walkways;
- Flushing the feed lanes and walkways for the mature cows (milk and dry cows) four times per day and flushing feed lanes and walkways for the remaining animals once per day (or for dairies that cannot use a flush system, Scraping feed lanes and walkways for mature cows with an automatic scraper (or equivalent) four times per day and cleaning feed lanes and walkways for support stock (heifers) at least once per day);
- Feeding all animals in accordance with National Research Council (NRC) or other District-approved guidelines;
- Properly sloping corrals (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal) or managing corrals to maintain a dry surface; and
- Scraping exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions.

Technologically Feasible:

None

Alternate Basic Equipment:

None

Description of Control Technologies

Concrete feed lanes and walkways

Dairy cows spend a large proportion of time on the feed lanes and walkways. A significant proportion of manure is consequently deposited in these areas. The concrete lanes and walkways are necessary for an effective flush system, which in turn is a key component of management practices used for the control of VOC and ammonia emissions (see below).

Increased Flushing for feed lanes and walkways

Many dairy operations use a flush system to remove manure from the feed lanes and walkways. The flush system introduces a large volume of water at the head of the paved area, and the cascading water carries the manure downslope. The required volume of flush water varies with the size and slope of the area to be flushed.

In addition to cleaning the feed lanes and walkways, the flush system also serves as an emissions control method. Ammonia is highly soluble in water. Therefore, a large proportion of ammonia in manure will dissolve in the flush water instead of being emitted directly from the housing areas. The flush water then carries the manure and the dissolved ammonia into the liquid manure storage system, where ammonia can be sequestered until it is applied to cropland as a nitrogen fertilizer.

Feed lanes and walkways are typically flushed once or twice per day in the mature cow housing areas; and as infrequently as once a week in the support stock housing areas. Flushing the lanes four times per day for mature cows and once per day for support stock will increase the frequency with which manure is removed from the housing areas, which should result in a higher percentage of ammonia being captured in the flush water, and therefore higher control efficiency.

Feeding all animals in accordance with National Research Council (NRC) or other District-approved guidelines

Nutritional management of dairy feed is routinely practiced to improve milk production and herd health. The potential for ammonia emissions can be reduced by reducing the amount of undigested nitrogen compounds in the manure. The level of microbial action in the manure corresponds to the level of organic nitrogen present, hence the lower the level of nitrogen the lower the level of microbial action and the lower the production of ammonia.

A diet that is formulated to feed proper amounts of ruminantly degradable protein will result in improved nitrogen utilization by the animal and corresponding reduction in urea and organic nitrogen content of the manure, which will reduce the production of VOC and ammonia. The latest National Research Council (NRC) guidelines for the selection of an optimal bovine diet should be followed to the maximum extent possible. The diet recommendations made in this publication seek to achieve the maximum uptake of protein by the animal and the minimum carryover of nitrogen into the manure.

Properly sloping exercise pens/corrals

Accumulation of water on exercise pen/corral surfaces, due to rain or on-farm activities, could result in anaerobic conditions and thereby increase emissions. Keeping exercise pen/corral surfaces dry and properly aerated, on the other hand, promotes the aerobic conditions that reduce emissions. Proper slope design is therefore required to ensure that drainage of any water deposited on the exercise pen surfaces will be as rapid as possible.

Scraping of exercise pens/corrals with a pull-type scraper

Frequent scraping of the corrals will reduce the amount of manure on the pen/corral surfaces, which will reduce VOC and ammonia emissions resulting from decomposition of this manure. This practice will also provide a uniform surface that promotes aerobic conditions on the pen/corral surface, which will reduce gaseous pollutants from this area.

Step 2 – Eliminate Technologically Infeasible Options

There are no technologically infeasible options to eliminate from step 1.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

The only control technology that is identified above is the use of the above listed achieved-in-practice control methods, therefore ranking is not required.

Step 4 - Cost Effectiveness Analysis

The above listed control technology is achieved-in-practice; therefore a cost analysis is not required.

Step 5 - Select BACT

The most effective NH₃ control technology not eliminated in Steps 2 and 4 above is the following listed achieved-in-practice NH₃ control methods:

- Concrete feed lanes and walkways;
- Flushing the feed lanes and walkways for the mature cows (milk and dry cows) four times per day and flushing feed lanes and walkways for the remaining animals once per day (or for dairies that cannot use a flush system, Scraping feed lanes and walkways for mature cows with an automatic scraper (or equivalent) four times per day and cleaning feed lanes and walkways for support stock (heifers) at least once per day);
- Feeding all animals in accordance with National Research Council (NRC) or other District-approved guidelines;
- Properly sloping corrals (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal) or managing corrals to maintain a dry surface;
- Scraping exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions; and

The applicant is proposing the use of the achieved-in-practice NH₃ control methods. Therefore, BACT for NH₃ is being proposed.

3. BACT Analysis for PM₁₀ Emissions from Freestall Barns 5 and 6

Step 1 - Identify all control technologies

Achieved-In-Practice

- Concrete feed lanes and walkways; and
- Scraping exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions.

Technologically Feasible:

None

Alternate Basic Equipment:

None

Description of Control Technologies

Concrete feed lanes and walkways

Constructing the feed lanes and walkways of concrete causes the dairy animals to spend an increased amount of time on a paved surface rather than dry dirt, thus reducing PM₁₀ emissions. Additionally, the manure that is deposited in the lanes and walkways will be flushed, which prevents PM₁₀ emissions from drying manure.

Scraping exercise pens every two weeks

Other than the paved feed lanes and walkways, exercise pen surfaces are composed of earth and deposited manure, both of which have the potential for particulate matter emissions due to wind or animal activities. Frequent scraping of these surfaces will reduce the amount of dry manure that may be pulverized by the cows' hooves and subsequently emitted PM₁₀.

Step 2 – Eliminate Technologically Infeasible Options

There are no technologically infeasible options to eliminate from step 1.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

The only control technology that is identified above is the use of the above listed achieved-in-practice control methods, therefore ranking is not required.

Step 4 - Cost Effectiveness Analysis

The above listed control technology is achieved-in-practice; therefore a cost analysis is not required.

Step 5 - Select BACT

The most effective PM₁₀ control technology not eliminated in Steps 2 and 4 above is the following listed achieved-in-practice VOC control methods:

- Concrete feed lanes and walkways; and
- Scraping exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions.

The applicant is proposing the use of the achieved-in-practice PM₁₀ control methods. Therefore, BACT for PM₁₀ is being proposed.

4. BACT Analysis for VOC Emissions from Shade Barns 1 and 2

Step 1 - Identify all control technologies

Achieved-In-Practice

- Concrete feed lanes and walkways;
- Flushing the feed lanes and walkways for the mature cows (milk and dry cows) four times per day and flushing feed lanes and walkways for the remaining animals once

per day (or for dairies that cannot use a flush system, Scraping feed lanes and walkways for mature cows with an automatic scraper (or equivalent) four times per day and cleaning feed lanes and walkways for support stock (heifers) at least once per day);

- Feeding all animals in accordance with National Research Council (NRC) or other District-approved guidelines;
- Properly sloping corrals (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal) or managing corrals to maintain a dry surface;
- Scraping exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions; and
- District Rule 4570 Mitigation Measures.

Technologically Feasible:

None

Alternate Basic Equipment:

None

Description of Control Technologies

Please refer to the above section for a description of the same control technologies used under this BACT guideline for VOC emissions.

Step 2 – Eliminate Technologically Infeasible Options

There are no technologically infeasible options to eliminate from step 1.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

The only control technology that is identified above is the use of the above listed achieved-in-practice control methods, therefore ranking is not required.

Step 4 - Cost Effectiveness Analysis

The above listed control technology is achieved-in-practice; therefore a cost analysis is not required.

Step 5 - Select BACT

The most effective VOC control technology not eliminated in Steps 2 and 4 above is the following listed achieved-in-practice VOC control methods:

- Concrete feed lanes and walkways;
- Flushing the feed lanes and walkways for the mature cows (milk and dry cows) four times per day and flushing feed lanes and walkways for the remaining animals once per day (or for dairies that cannot use a flush system, Scraping feed lanes and walkways for mature cows with an automatic scraper (or equivalent) four times per

day and cleaning feed lanes and walkways for support stock (heifers) at least once per day);

- Feeding all animals in accordance with National Research Council (NRC) or other District-approved guidelines;
- Properly sloping corrals (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal) or managing corrals to maintain a dry surface;
- Scraping exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions; and
- District Rule 4570 Mitigation Measures.

The applicant is proposing the use of the achieved-in-practice VOC control methods. Therefore, BACT for VOC is being proposed.

5. BACT Analysis for NH₃ Emissions from Shade Barns 1 and 2

Step 1 - Identify all control technologies

Achieved-In-Practice

- Concrete feed lanes and walkways;
- Flushing the feed lanes and walkways for the mature cows (milk and dry cows) four times per day and flushing feed lanes and walkways for the remaining animals once per day (or for dairies that cannot use a flush system, Scraping feed lanes and walkways for mature cows with an automatic scraper (or equivalent) four times per day and cleaning feed lanes and walkways for support stock (heifers) at least once per day);
- Feeding all animals in accordance with National Research Council (NRC) or other District-approved guidelines;
- Properly sloping corrals (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal) or managing corrals to maintain a dry surface; and
- Scraping exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions.

Technologically Feasible:

None

Alternate Basic Equipment:

None

Description of Control Technologies

Please refer to the above section for a description of the same control technologies used under this BACT guideline for NH₃ emissions.

Step 2 – Eliminate Technologically Infeasible Options

There are no technologically infeasible options to eliminate from step 1.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

The only control technology that is identified above is the use of the above listed achieved-in-practice control methods, therefore ranking is not required.

Step 4 - Cost Effectiveness Analysis

The above listed control technology is achieved-in-practice; therefore a cost analysis is not required.

Step 5 - Select BACT

The most effective NH₃ control technology not eliminated in Steps 2 and 4 above is the following listed achieved-in-practice NH₃ control methods:

- Concrete feed lanes and walkways;
- Flushing the feed lanes and walkways for the mature cows (milk and dry cows) four times per day and flushing feed lanes and walkways for the remaining animals once per day (or for dairies that cannot use a flush system, Scraping feed lanes and walkways for mature cows with an automatic scraper (or equivalent) four times per day and cleaning feed lanes and walkways for support stock (heifers) at least once per day);
- Feeding all animals in accordance with National Research Council (NRC) or other District-approved guidelines;
- Properly sloping corrals (minimum of 3% slope where the available space for each animal is 400 square feet or less and minimum of 1.5% where the available space for each animal is more than 400 square feet per animal) or managing corrals to maintain a dry surface;
- Scraping exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions; and

The applicant is proposing the use of the achieved-in-practice NH₃ control methods. Therefore, BACT for NH₃ is being proposed.

6. BACT Analysis for PM₁₀ Emissions from Shade Barn 2

Step 1 - Identify all control technologies

Achieved-In-Practice

- Concrete feed lanes and walkways;
- Scraping exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions;
- Windbreaks controlling dust from corrals (when feasible, supported by soil conditions, and there is adequate space at existing facilities); or
- An alternative measure with equivalent PM control (e.g. sprinkling/water application over at least 25% of the corral surface or average corral surface moisture content (wet-based) ≥ 16%) may be applied as a replacement for the previous measures.

Technologically Feasible:

None

Alternate Basic Equipment:
None

Description of Control Technologies

Concrete Feed Lanes and Walkways

Constructing the feed lanes and walkways of concrete causes the dairy animals to spend an increase amount of time on a paved surface rather than dry dirt, thus reducing PM₁₀ emissions. Additionally, the manure that is deposited in the lanes and walkways will be flushed, which will prevent PM₁₀ emissions from drying manure.

Scraping of exercise pens with a pull-type scraper

Other than the paved feed lanes and walkways, exercise pen surfaces are composed of earth and deposited manure, both of which have the potential for particulate matter emissions due to wind or animal activities. Frequent scraping of these surfaces will reduce the amount of dry manure that may be pulverized by the cow's hooves and subsequently emitted as PM₁₀.

Windbreaks

A windbreak, or shelterbelt, is composed of one or more rows of trees or shrubs, which are planted in a manner that breaks up wind and reduces the force of wind on downwind of the windbreak. Windbreaks can be used to prevent soil erosion, improve air quality by intercepting dust, chemicals, and odors, to protect crops, and to provide habitat for wildlife. The District has worked with the National Resources Conservation Services (NRCS) to establish guidelines for windbreaks used for dust control around dairies. In general, the guidelines require that a downwind shelterbelt with three rows be installed, the first row consisting of shrubs, second row consisting of a medium size tree and the last row consisting of an evergreen (large tree). NRCS also requires that an irrigation system be maintained so that there is greater survivability and rapid growth of the trees and shrubs. A windbreak will reduce the amount of particulate matter entrained into the atmosphere.

There may be instances where windbreaks are not practical or feasible for a particular operation such as existing dairy facilities that is expanding but lacks adequate space for a windbreak. The soil conditions in the area where installation of the windbreak would be required should also be considered when determining if establishment of windbreaks is feasible for a particular dairy. Soil properties that should be considered include, but are not limited to, the pH and salinity or electrical conductivity of the soil. It is best to consult the NRCS or other experts to determine if a particular area can reasonably sustain windbreaks. NRCS also maintains information on the soil properties and vegetative productivity of agricultural areas, which is available online through their Web Soil Survey¹⁶. Another possible factor that may need to be considered when determining if windbreaks are feasible in a particular area is if insufficient water is available for establishment of a windbreak because of sustained drought conditions. Windbreaks will not be required if an operation demonstrates satisfactorily that they are infeasible or

¹⁶ The NRCS Web Soil Survey can be accessed at <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>.

impractical for the particular operation. Additionally, because there are a number of factors (soil conditions, drought/water availability of sufficient water, climate, etc.) that are specific to each site that must be considered when determining if an effective windbreak can be established and maintained, as with other BACT requirements dairies will be allowed to substitute an alternative measure that can achieve equivalent PM₁₀ reductions.

Corral Sprinkling/Water Application

When done at a rate sufficient to match the evaporation rate, sprinkling will keep corral surfaces consistently moist. This will reduce PM₁₀ emissions by preventing any loose soil and dried manure from being entrained into the air by wind movement and/or animal activities. Water application rates must be properly adjusted, since excess water could potentially increase VOC and NH₃ emissions; and may also pose a health risk for the animals.

Step 2 – Eliminate Technologically Infeasible Options

There are no technologically infeasible options to eliminate from step 1.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

The only control technology that is identified above is the use of the above listed achieved-in-practice control methods, therefore ranking is not required.

Step 4 - Cost Effectiveness Analysis

The above listed control technology is achieved-in-practice; therefore a cost analysis is not required.

Step 5 - Select BACT

The most effective VOC control technology not eliminated in Steps 2 and 4 above is the following listed achieved-in-practice PM₁₀ control methods:

- Concrete feed lanes and walkways;
- Scraping exercise pens every two weeks using pull-type scraper in the morning hours except when prevented by wet conditions.
- Windbreaks controlling dust from corrals (when feasible, supported by soil conditions, and there is adequate space at existing facilities).

The applicant is proposing the use of the achieved-in-practice PM₁₀ control methods. Therefore, BACT for PM₁₀ is being proposed.

7. BACT Analysis for VOC and NH₃ Emissions from the New Calf Hutches

Step 1 - Identify all control technologies

Achieved-In-Practice

- Flushing or scraping to remove manure from the cow housing areas for the baby calves at least once per week; and

- Feeding baby dairy calves in accordance with National Research Council (NRC) or other District-approved guidelines.

Technologically Feasible:

None

Alternate Basic Equipment:

None

Description of Control Technologies

Flushing or Scraping of calf housing areas

Frequent flushing or scraping of the calf housing areas will reduce the amount of manure on the area surfaces, which will reduce VOC and ammonia (NH₃) emissions resulting from decomposition of this manure. Scraping of the housing area surfaces will also provide a uniform surface that promotes aerobic conditions, which will reduce gaseous pollutants from these areas.

Feeding baby dairy calves in accordance with National Research Council (NRC) or other District-approved guidelines

Nutritional management of dairy feed is routinely practiced to improve milk production and herd health. The potential for VOC emissions can be reduced by reducing the quantity of undigested nutrients in the manure. Many of the VOCs emitted from Confined Animal Facilities, including dairies, originate from the decomposition of undigested protein in animal waste. This undigested protein also produces ammonia emissions. The level of microbial action in the manure corresponds to the level of organic nitrogen content in the manure; the lower the level of nitrogen the lower the level of microbial action and the lower the production of ammonia and VOCs.

A diet that is formulated to feed proper amounts of ruminantly degradable protein will result in improved nitrogen utilization by the animal and corresponding reduction in urea and organic nitrogen content of the manure, which will reduce the production of VOCs and ammonia. The latest National Research Council (NRC) guidelines for the selection of an optimal bovine diet should be followed to the maximum extent possible. The diet recommendations made in this publication seek to achieve the maximum uptake of protein by the animal and the minimum carryover of nutrients into the manure.

Based on very limited data (Klaunser, 1998, *J Prod Agric*), diet manipulation decreased nitrogen excretion by 34% while improving milk production. Up to 70% of excess nitrogen is lost off of the farm through volatilization, denitrification and leaching. Because of limited research, feeding cows in accordance with National Research Council (NRC) or other District-approved guidelines will be conservatively assumed to have a control efficiency of only 5-10% for both enteric and manure VOC emissions.

Step 2 – Eliminate Technologically Infeasible Options

There are no technologically infeasible options to eliminate from step 1.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

The only control technology that is identified above is the use of the above listed achieved-in-practice control methods, therefore ranking is not required.

Step 4 - Cost Effectiveness Analysis

The above listed control technology is achieved-in-practice; therefore a cost analysis is not required.

Step 5 - Select BACT

The most effective VOC and NH₃ control technology not eliminated in Steps 2 and 4 above is the following listed achieved-in-practice VOC and NH₃ control methods:

- Flushing or scraping to remove manure from the cow housing areas for the baby calves at least once per week; and
- Feeding baby dairy calves in accordance with National Research Council (NRC) or other District-approved guidelines.

The applicant is proposing the use of the achieved-in-practice VOC and NH₃ control methods. Therefore, BACT for VOC and NH₃ is being proposed.

8. BACT Analysis for PM₁₀ Emissions from the New Calf Hutches

Step 1 - Identify all control technologies

Achieved-In-Practice

- Use of Calf Hutches

Technologically Feasible:

None

Alternate Basic Equipment:

None

Description of Control Technologies

Use of Calf Hutches

Baby dairy calves are typically housed in small open corrals or calf hutches. An open corral is an open area where animals are confined and provided with feed and water. The surface of open corrals is composed of earth. In corrals that house baby dairy calves other bedding materials may also be placed on the corral surface. The dirt, bedding material, and manure deposited on the surface of the open corrals are potential sources of particulate matter emissions as a result of animal movement and disturbance caused by the wind. Housing baby dairy calves in calf hutches will reduce particulate emissions because the calves will be confined within the hutches, significantly limiting their movement, and hutches will also significantly reduce the disturbance caused by the wind.

Step 2 – Eliminate Technologically Infeasible Options

There are no technologically infeasible options to eliminate from step 1.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

The only control technology that is identified above is the use of the above listed achieved-in-practice control methods, therefore ranking is not required.

Step 4 - Cost Effectiveness Analysis

The above listed control technology is achieved-in-practice; therefore a cost analysis is not required.

Step 5 - Select BACT

The most effective PM₁₀ control technology not eliminated in Steps 2 and 4 above is the following listed achieved-in-practice VOC and NH₃ control methods:

- Use of Calf Hutches.

The applicant is proposing the use of the achieved-in-practice PM₁₀ control method. Therefore, BACT for PM₁₀ is being proposed.

II. Top-Down BACT and T-BACT Analysis for Liquid Manure Handling (ATC Permit N-8441-3-2):

BACT Guideline 5.8.6 applies to the proposed modified liquid manure handling for lagoon/storage ponds and BACT Guideline 5.8.7 applies to the proposed modified liquid manure handling for liquid/slurry land application. In accordance with the District BACT policy, information from these guidelines will be utilized without further analysis.

1. BACT and T-BACT Analysis for VOC Emissions from Lagoon/Storage Ponds

Step 1 - Identify all control technologies

Achieved-In-Practice

- Anaerobic treatment lagoon designed according to NRCS guidelines, and solids removal/separation system (mechanical separator(s) or settling basin(s)/weeping wall(s)).

Technologically Feasible:

- Aerobic treatment lagoon or mechanically aerated lagoon.
- Covered lagoon digester vented to a control device with minimum 95% control.

Alternate Basic Equipment:

None

Description of Control Technologies

Aerobic Treatment Lagoon or Mechanically Aerated Lagoon

An aerobic lagoon is a waste treatment lagoon that is designed to facilitate the decomposition of wastewater by microbes in the presence of oxygen (O_2). The process of aerobic decomposition results in the conversion of organic compounds in the wastewater into carbon dioxide (CO_2), and (H_2O), nitrates, sulfates, and inert biomass (sludge). This process is sometimes referred to as nitrification (especially when discussing NH_3 transformation). Complete aerobic decomposition (100% aeration) removes nearly all malodors and also virtually eliminates VOC, H_2S , and NH_3 emissions.

In completely aerated lagoons, sufficient oxygen must be provided to sustain the aerobic microorganisms. NRCS Practice Standard Code 359 specifies that naturally aerobic lagoons have a minimum surface area determined by regional climate and daily Biological Oxygen Demand (BOD_5) and requires naturally aerobic lagoons to have a maximum depth no greater than five feet. For mechanically aerated lagoons, NRCS Practice Standard Code 359 specifies that the aeration equipment shall provide a minimum of 1 pound of oxygen for each pound of daily BOD_5 loading. The mechanical aerators that provide the required oxygen may float on the lagoon surface or be submerged in the lagoon. Aeration can also be performed by injection of tiny air bubbles into the lagoon water, mixing of the lagoon water, or spraying of the water into the air. According to Dr. Ruihong Zhang, a researcher at the University of California, Davis, at least 95% VOC control can be achieved if the dissolved oxygen (DO) concentration of the liquid manure is 2.0 mg/L or more. However, the DO concentrations achieved in mechanically aerated lagoons treating manure are typically much less than this and the control efficiencies will therefore be lower.

Covered Lagoon Digester

Covered treatment lagoons are one type of anaerobic digester. An anaerobic digester is an enclosed basin or tank that is designed to facilitate the decomposition of wastewater by microbes in the absence of oxygen. The process of anaerobic decomposition results in the preferential conversion of organic compounds in the wastewater into methane (CH_4), carbon dioxide (CO_2), and water rather than intermediate metabolites (VOC). The gas generated by this process is known as biogas, waste gas or digester gas. In addition to methane and carbon dioxide, biogas also contains small amounts of Nitrogen (N_2), Oxygen (O_2), Hydrogen Sulfide (H_2S), and Ammonia (NH_3). Biogas will also include trace amounts of various Volatile Organic Compounds (VOCs) that remain from incomplete digestion of the volatile solids in the incoming wastewater. The small amounts of undigested solids that remain after digestion are removed from the digester as sludge. Because biogas is mostly composed of methane, the main component of natural gas, the gas produced in the digester can be cleaned to remove H_2S and other impurities and used as fuel. The captured biogas can be combusted in a flare or may be sent to a boiler or internal combustion engine, where the gas can be used to generate useful heat or electrical energy.

As stated above, the gas generated in the covered lagoon anaerobic digester can be captured and then sent to a suitable combustion device. During combustion, gaseous hydrocarbons are oxidized to form CO₂ and water. The VOC emitted from the liquid manure in the covered lagoon can be reduced by 95% with the use of an appropriate combustion device. Therefore, installation of the digester will lower the total VOC emitted from the liquid manure handling system. Although the control efficiency of the gas captured from the primary lagoon is expected to be 95% or more, the overall control efficiency is expected to be less, since some VOC will also be emitted from the storage pond and as fugitive emissions. For this analysis, the overall control efficiency is assumed to be 80% of the emissions that would have been emitted from the lagoon system.

Anaerobic Treatment Lagoon and Solids Removal/Separation System

An anaerobic treatment lagoon is a waste treatment lagoon that is designed to facilitate the decomposition of manure by microbes in the absence of oxygen. The process of anaerobic decomposition results in the preferential conversion of organic compounds in the wastewater into methane (CH₄), carbon dioxide (CO₂), and water rather than intermediate metabolites (VOC). The Natural Resources Conservation Service (NRCS) Field Office Technical Guide No. 359, Waste Treatment Lagoon, for California specifies the following criteria for the design of anaerobic treatment lagoons:

- Required volume - the minimum design volume should account for all potential sludge, treatment, precipitation, and runoff volumes.
- Treatment period - retention time of the material in the lagoon shall be the time required to provide environmentally safe utilization of waste. The minimum hydraulic retention time for a covered lagoon in the San Joaquin Valley is about 38 days.
- Waste loading shall be based on the maximum daily loading considering all waste sources that will be treated by the lagoon. The loading rate is typically based on volatile solids (VS) loading per unit of volume. The suggested loading rate for the San Joaquin Valley is 6.5-11 lb-VS/1000 ft³/day depending on separation and type of system.
- The operating depth of the lagoon as per Guide No. 359, Waste Treatment Lagoon. Maximizing the depth of the lagoon minimizes the surface area, which in turn minimizes the cover size and cost. Increasing the lagoon depth has the following advantages:
 - Minimizes surface area in contact with the atmosphere, thus reducing surface available to convection, evaporation
 - Smaller surface areas provide a more favorable and stable environment for methane bacteria
 - Better mixing of lagoon due to rising gas bubbles
 - Requires less land
 - More efficient for mechanical mixing

The lagoon design shall also consider location, soils and foundation, erosion, and depth to groundwater as required by the regional water control board.

The NRCS guideline suggests that this system consist of two cells, a treatment lagoon (primary lagoon) and a storage pond (secondary lagoon). The first stage of the lagoon system is the biological treatment stage and is designed with a constant liquid level to stabilize the anaerobic digestion. The effluent from the first stage overflows into a second lagoon designed for liquid storage capacity. Effluent from the second lagoon/storage pond is used in the flush lanes and for the irrigation of cropland. The secondary (overflow) lagoon acts as the storage pond, which can be emptied when necessary. However, a single lagoon can also be considered an anaerobic lagoon as long as all the criteria are met and that the liquid manure is not drawn less than 6 feet at any time.

A properly designed anaerobic treatment lagoon will reduce the volatile solids (VS) by at least 50%. This will reduce the biological oxygen demand (BOD) and increase the efficiency at which organic compounds are converted into methane and carbon dioxide rather than VOC. Although the VS reduction is expected to be at least 50%, a conservative control efficiency of 40% will be assumed, until better data becomes available.

Solids Removal/Separation - Mechanical Separator(s)

Mechanical separators separate solids out from the liquid/slurry stream. There are many different versions of separators on the market. The percentage of separation varies depending on screen size and type of separation system. However, a 50% solid removal efficiency is used as a general rule of thumb. Although the separation efficiency can be improved by better separation or addition of separators or screens, it does not necessarily result in an increase in VOC emission reduction. The type of solids removed are generally non-digestible (lignins, cellulose, etc.) materials that do not easily degrade in the lagoons. The amount of volatile solids that ends up in the lagoon will most likely not change even though there is an increase in solid removal efficiency. In addition, there is no data that links higher removal efficiency with an increase in VOC emission reduction.

Step 2 – Eliminate Technologically Infeasible Options

There are no technologically infeasible options to eliminate from step 1.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

The remaining options are ranked below according to their control effectiveness:

- 1) Aerobic treatment lagoon or mechanically aerated lagoon (95% control efficiency).
- 2) Covered lagoon digester vented to a control device (80% control efficiency).
- 3) Anaerobic treatment lagoon designed to meet Natural Resources Conservation Service (NRCS) standards and solids removal/separation system (40% control efficiency).

Step 4 - Cost Effectiveness Analysis

(1). Aerobic Treatment Lagoon or Mechanical Aerated Lagoon

The facility has proposed to install and utilize mechanically aerated treatment lagoons. Since the facility has proposed to implement this control option, a cost effectiveness analysis is not required.

(2). Covered Lagoon Digester vented to a Control Device

The applicant has proposed the use of the most stringent control option as identified above. Cost effectiveness analyses are therefore not required for this control option.

(3). Anaerobic Treatment Lagoon and Solids Removal/Separation System

The applicant has proposed the use of the most stringent control option as identified above. In addition, these options are achieved in practice. Cost effectiveness analyses are therefore not required for this control option.

Step 5 - Select BACT and T-BACT

The most effective VOC control technology not eliminated in Steps 2 and 4 above is the following listed technologically feasible VOC control method:

- Use of mechanically aerated treatment lagoons.

The applicant is proposing the use of the most stringent VOC control methods (using mechanically aerated treatment lagoons). Therefore, BACT and T-BACT for VOC is being proposed.

2. BACT Analysis for NH₃ Emissions from Lagoon/Storage Ponds

Step 1 - Identify all control technologies

Achieved-In-Practice

- All animals fed in accordance with Natural Resources Conservation Services (NRCS) or other District-approved guidelines.

Technologically Feasible:

None

Alternate Basic Equipment:

None

Description of Control Technologies

Feeding all animals in accordance with National Research Council (NRC) or other District-approved guidelines

Nutritional management of dairy feed is routinely practiced to improve milk production and herd health. The potential for ammonia emissions can be reduced by reducing the amount of undigested nitrogen compounds in the manure. The level of microbial action in the manure corresponds to the level of organic nitrogen present, hence the lower the level of nitrogen the lower the level of microbial action and the lower the production of ammonia and VOCs.

A diet that is formulated to feed proper amounts of ruminantly degradable protein will result in improved nitrogen utilization by the animal and corresponding reduction in urea and organic nitrogen content of the manure, which will reduce the production of VOC and

ammonia. The latest National Research Council (NRC) guidelines for the selection of an optimal bovine diet should be followed to the maximum extent possible. The diet recommendations made in this publication seek to achieve the maximum uptake of protein by the animal and the minimum carryover of nitrogen into the manure, which will reduce ammonia emissions from liquid manure in the lagoon and storage pond.

Step 2 – Eliminate Technologically Infeasible Options

There are no technologically infeasible options to eliminate from step 1.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

The only control technology that is identified above is the use of the above listed achieved-in-practice control method, therefore ranking is not required.

Step 4 - Cost Effectiveness Analysis

The above listed control technology is achieved-in-practice; therefore a cost analysis is not required.

Step 5 - Select BACT

The most effective NH₃ control technology not eliminated in Steps 2 and 4 above is the following listed achieved-in-practice NH₃ control method:

- All animals fed in accordance with Natural Resources Conservation Services (NRCS) or other District-approved guidelines.

The applicant is proposing the use of the achieved-in-practice NH₃ control method. Therefore, BACT for NH₃ is being proposed.

3. BACT and T-BACT Analysis for VOC Emissions from Liquid/Slurry Land Application

Step 1 - Identify all control technologies

Achieved-In-Practice

- Irrigation of crops using liquid/slurry manure from the secondary lagoon/holding/storage pond preceded by an uncovered anaerobic treatment lagoon designed to meet NRCS standards.

Technologically Feasible:

- Irrigation of crops using liquid manure from an aerobic treatment lagoon or mechanically aerated lagoon (95% VOC control efficiency).
- Irrigation of crops using liquid manure from a holding/storage pond after being treated in a covered lagoon/digester (80% VOC control efficiency).

Alternate Basic Equipment:

None

Description of Control Technologies

Irrigation of crops using liquid/slurry manure from an aerobic treatment lagoon or mechanically aerated lagoon

An aerobic lagoon is a waste treatment lagoon that is designed to facilitate the decomposition of wastewater by microbes in the presence of oxygen (O_2). The process of aerobic decomposition results in the conversion of organic compounds in the wastewater into carbon dioxide (CO_2), and (H_2O), nitrates, sulfates, and inert biomass (sludge). This process is sometimes referred to as nitrification (especially when discussing NH_3 transformation). Complete aerobic decomposition (100% aeration) removes nearly all malodors and also virtually eliminates VOC, H_2S , and NH_3 emissions. In completely aerated lagoons, sufficient oxygen must be provided to sustain the aerobic microorganisms. NRCS Practice Standard Code 359 specifies that naturally aerobic lagoons have a minimum surface area determined by regional climate and daily Biological Oxygen Demand (BOD_5) and requires naturally aerobic lagoons to have a maximum depth no greater than five feet. For mechanically aerated lagoons, NRCS Practice Standard Code 359 specifies that the aeration equipment shall provide a minimum of 1 pound of oxygen for each pound of daily BOD_5 loading. The mechanical aerators that provide the required oxygen may float on the lagoon surface or be submerged in the lagoon. Aeration can also be performed by injection of tiny air bubbles into the lagoon water, mixing of the lagoon water, or spraying of the water into the air. According to Dr. Ruihong Zhang, a researcher at the University of California, Davis, at least 95% VOC control can be achieved if the dissolved oxygen (DO) concentration of the liquid manure is 2.0 mg/L or more. However, the DO concentrations achieved in mechanically aerated lagoons treating manure are typically much less than this and the control efficiencies will therefore be lower.

Irrigation of crops using liquid/slurry manure from a holding/storage pond after being treated in a covered lagoon/digester

This practice would only allow the irrigation of liquid manure to cropland from the secondary lagoon after proper treatment has taken place in a covered lagoon/anaerobic digester. Covered treatment lagoons are one type of anaerobic digester. An anaerobic digester is an enclosed basin or tank that is designed to facilitate the decomposition of wastewater by microbes in the absence of oxygen. The process of anaerobic decomposition results in the preferential conversion of organic compounds in the wastewater into methane (CH_4), carbon dioxide (CO_2), and water rather than intermediate metabolites (VOC). The gas generated by this process is known as biogas, waste gas or digester gas. In addition to methane and carbon dioxide, biogas also contains small amounts of Nitrogen (N_2), Oxygen (O_2), Hydrogen Sulfide (H_2S), and Ammonia (NH_3). Biogas will also include trace amounts of various VOC that remain from incomplete digestion of the volatile solids in the incoming wastewater. The small amounts of undigested solids are removed from the digester as sludge.

Assumptions:

- 80% of the Volatile Solids (VS) can be removed from the covered anaerobic digestion process.

- 20% of the remaining VS will be assumed to be in the manure during land application. This will be considered worst-case because further digestion of the VS is likely to occur in the secondary lagoon.
- As a worst-case scenario, it will be assumed that all remaining VS will be emitted as VOC during land application.

Since 80% of the VS is removed or digested in the covered lagoon and the remaining VS have been assumed to be emitted as VOC, a control efficiency of 80% can be used for land application of liquid manure from a holding/storage pond after treatment in a covered lagoon.

Irrigation of crops using liquid/slurry manure from the secondary lagoon/holding/storage pond where preceded by an uncovered anaerobic treatment lagoon designed to meet Natural Resources Conservation Service (NRCS) standards

This practice would only allow the irrigation of liquid manure to cropland from the secondary lagoon after going through a treatment phase in an anaerobic treatment lagoon, or the primary lagoon.

An anaerobic treatment lagoon is a waste treatment lagoon that is designed to facilitate the decomposition of manure by microbes in the absence of oxygen. The process of anaerobic decomposition results in the preferential conversion of organic compounds in the wastewater into methane (CH₄), carbon dioxide (CO₂), and water rather than intermediate metabolites (VOC).

The NRCS Field Office Technical Guide No. 359, Waste Treatment Lagoon, for California specifies the following criteria for anaerobic treatment lagoons:

- Required volume - the minimum design volume should account for all potential sludge, treatment, precipitation, and runoff volumes.
- Treatment period - retention time of the material in the lagoon shall be the time required to provide environmentally safe utilization of waste. The minimum hydraulic retention time for a covered lagoon in the San Joaquin Valley is about 38 days.
- Waste loading shall be based on the maximum daily loading considering all waste sources that will be treated by the lagoon. The loading rate is typically based on volatile solids (VS) loading per unit of volume. The suggested loading rate for the San Joaquin Valley is 6.5-11 lb-VS/1000 ft³/day depending on separation and type of system.
- The operating depth of the lagoon as per Guide No. 359, Waste Treatment Lagoon. Maximizing the depth of the lagoon minimizes the surface area, which in turn minimizes the cover size and cost. Increasing the lagoon depth has the following advantages:
 - Minimizes surface area in contact with the atmosphere, thus reducing surface available to convection, evaporation

- Smaller surface areas provide a more favorable and stable environment for methane bacteria
- Better mixing of lagoon due to rising gas bubbles
- Requires less land
- More efficient for mechanical mixing

The lagoon design shall also consider location, soils and foundation, erosion, and depth to groundwater as required by the regional water control board.

The NRCS guideline suggests that this system consist of two cells, a treatment lagoon (primary lagoon) and a storage pond (secondary lagoon). The first stage of the lagoon system is the biological treatment stage and is designed with a constant liquid level to stabilize the anaerobic digestion. The effluent from the first stage overflows into a second lagoon designed for liquid storage capacity. Effluent from the second lagoon/storage pond is used in the flush lanes and for the irrigation of cropland. The secondary (overflow) lagoon acts as the storage pond, which can be emptied when necessary.

A properly designed anaerobic treatment lagoon will reduce the volatile solids (VS) by at least 50%. This will reduce the biological oxygen demand (BOD) and increase the efficiency at which organic compounds are converted into methane and carbon dioxide rather than VOC. Since 50% of the VS in the liquid manure will have been removed or digested in the lagoon, there will be less VS remaining in the effluent to decompose into VOC. Although, the VS reduction will be at least 50%, a conservative control efficiency of 40% will be applied to irrigation from a storage pond after an anaerobic treatment lagoon.

Step 2 – Eliminate Technologically Infeasible Options

There are no technologically infeasible options to eliminate from step 1.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

The remaining options are ranked below according to their control effectiveness:

- 1) Irrigation of crops using liquid manure from an aerobic treatment lagoon or mechanically aerated lagoon (95% VOC control efficiency).
- 2) Irrigation of crops using liquid manure from a holding/storage pond after being treated in a covered lagoon/digester (80% VOC control efficiency).
- 3) Irrigation of crops using liquid/slurry manure from the secondary lagoon/holding/storage pond preceded by an uncovered anaerobic treatment lagoon designed to meet NRCS standards (40% VOC control efficiency).

Step 4 - Cost Effectiveness Analysis

(1). Irrigation of crops using liquid/slurry from an aerobic treatment lagoon or mechanically aerated lagoon

The facility has proposed to irrigate their crops using liquid/slurry manure after being treated in mechanically aerated lagoons. Since the facility has proposed to implement this control option, a cost effectiveness analysis is not required.

(2). Irrigation of crops using liquid manure from a holding/storage pond after being treated in a covered lagoon/digester

The applicant has proposed the use of the most stringent control option as identified above. Cost effectiveness analyses are therefore not required for this control option.

(3). Irrigation of crops using liquid/slurry manure from the secondary lagoon/holding/storage pond preceded by an uncovered anaerobic treatment lagoon designed to meet NRCS standards

The applicant has proposed the use of the most stringent control option as identified above. In addition, these options are achieved in practice. Cost effectiveness analyses are therefore not required.

Step 5 - Select BACT and T-BACT

The most effective VOC control technology not eliminated in Steps 2 and 4 above is the following listed technologically feasible VOC control method:

- Irrigation of crops using liquid/slurry manure from mechanically aerated lagoons.

The applicant is proposing the use of the most stringent VOC control method. Therefore, BACT and T-BACT for VOC is being proposed.

4. BACT Analysis for NH₃ Emissions from Liquid/Slurry Land Application

Step 1 - Identify all control technologies

Achieved-In-Practice

- All animals fed in accordance with Natural Resources Conservation Services (NRCS) or other District-approved guidelines.

Technologically Feasible:

None

Alternate Basic Equipment:

None

Description of Control Technologies

Feeding all animals in accordance with National Research Council (NRC) or other District-approved guidelines

Nutritional management of dairy feed is routinely practiced to improve milk production and herd health. The potential for ammonia emissions can be reduced by reducing the amount of undigested nitrogen compounds in the manure. The level of microbial action in the manure corresponds to the level of organic nitrogen present, hence the lower the level of nitrogen the lower the level of microbial action and the lower the production of ammonia and VOCs.

A diet that is formulated to feed proper amounts of ruminantly degradable protein will result in improved nitrogen utilization by the animal and corresponding reduction in urea and organic nitrogen content of the manure, which will reduce the production of VOC and ammonia. The latest National Research Council (NRC) guidelines for the selection of an optimal bovine diet should be followed to the maximum extent possible. The diet recommendations made in this publication seek to achieve the maximum uptake of protein by the animal and the minimum carryover of nitrogen into the manure, which will reduce ammonia emissions from liquid manure applied to cropland.

Step 2 – Eliminate Technologically Infeasible Options

There are no technologically infeasible options to eliminate from step 1.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

The only control technology that is identified above is the use of the above listed achieved-in-practice control method, therefore ranking is not required.

Step 4 - Cost Effectiveness Analysis

The above listed control technology is achieved-in-practice; therefore a cost analysis is not required.

Step 5 - Select BACT

The most effective NH₃ control technology not eliminated in Steps 2 and 4 above is the following listed achieved-in-practice NH₃ control method:

- All animals fed in accordance with Natural Resources Conservation Services (NRCS) or other District-approved guidelines.

The applicant is proposing the use of the achieved-in-practice NH₃ control method. Therefore, BACT for NH₃ is being proposed.

III. Top-Down BACT Analysis for Solid Manure Handling (ATC Permit N-8441-4-1):

BACT Guideline 5.8.8 applies to the proposed modified solid manure handling for storage/separated solids piles and BACT Guideline 5.8.9 applies to the proposed modified solid manure handling for land application. In accordance with the District BACT policy, information from these guidelines will be utilized without further analysis.

1. BACT Analysis for NH₃ Emissions from Storage/Separated Solids Piles

Step 1 - Identify all control technologies

Achieved-In-Practice

- All animals fed in accordance with Natural Resources Conservation Services (NRCS) or other District-approved guidelines.

Technologically Feasible:

None

Alternate Basic Equipment:
None

Description of Control Technologies

Feeding all animals in accordance with National Research Council (NRC) or other District-approved guidelines

Nutritional management of dairy feed is routinely practiced to improve milk production and herd health. The potential for ammonia emissions can be reduced by reducing the amount of undigested nitrogen compounds in the manure. The level of microbial action in the manure corresponds to the level of organic nitrogen present, hence the lower the level of nitrogen the lower the level of microbial action and the lower the production of ammonia and VOCs.

A diet that is formulated to feed proper amounts of ruminantly degradable protein will result in improved nitrogen utilization by the animal and corresponding reduction in urea and organic nitrogen content of the manure, which will reduce the production of VOC and ammonia. The latest National Research Council (NRC) guidelines for the selection of an optimal bovine diet should be followed to the maximum extent possible. The diet recommendations made in this publication seek to achieve the maximum uptake of protein by the animal and the minimum carryover of nitrogen into the manure, which will reduce ammonia emissions from solid manure.

Step 2 – Eliminate Technologically Infeasible Options

There are no technologically infeasible options to eliminate from step 1.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

The only control technology that is identified above is the use of the above listed achieved-in-practice control method, therefore ranking is not required.

Step 4 - Cost Effectiveness Analysis

The above listed control technology is achieved-in-practice; therefore a cost analysis is not required.

Step 5 - Select BACT

The most effective NH₃ control technology not eliminated in Steps 2 and 4 above is the following listed achieved-in-practice NH₃ control method:

- All animals fed in accordance with Natural Resources Conservation Services (NRCS) or other District-approved guidelines.

The applicant is proposing the use of the achieved-in-practice NH₃ control method. Therefore, BACT for NH₃ is being proposed.

2. BACT Analysis for NH₃ Emissions from Land Application

Step 1 - Identify all control technologies

Achieved-In-Practice

- Rapid incorporation of solid manure into the soil after land application, and all animals fed in accordance with Natural Resources Conservation Services (NRCS) or other District-approved guidelines.

Technologically Feasible:

None

Alternate Basic Equipment:

None

Description of Control Technologies

Rapid Incorporation of Solid Manure into the Soil after Land Application

Various types of spreading techniques, such as box spreaders, flail type spreaders, side discharge spreaders, and spinner spreaders, are used to apply solid manure to cropland. Regardless of which technique is used, this practice requires the immediate incorporation of the manure into the soil, reducing emissions and surface run-off while minimizing the loss of nitrogen into the atmosphere. Based on a study by a local Valley dairy, there is a great potential of reducing emissions by incorporating slurry manure rapidly into the soil. A similar reduction may be obtained by the rapid incorporation of solid manure. This technology is expected to yield a NH₃ control efficiency ranging from 49% to upwards of 98%.¹⁷

Feeding all animals in accordance with National Research Council (NRC) or other District-approved guidelines

Nutritional management of dairy feed is routinely practiced to improve milk production and herd health. The potential for ammonia emissions can be reduced by reducing the amount of undigested nitrogen compounds in the manure. The level of microbial action in the manure corresponds to the level of organic nitrogen present, hence the lower the level of nitrogen the lower the level of microbial action and the lower the production of ammonia and VOCs.

A diet that is formulated to feed proper amounts of ruminantly degradable protein will result in improved nitrogen utilization by the animal and corresponding reduction in urea and organic nitrogen content of the manure, which will reduce the production of VOC and ammonia. The latest National Research Council (NRC) guidelines for the selection of an optimal bovine diet should be followed to the maximum extent possible. The diet recommendations made in this publication seek to achieve the maximum uptake of protein by the animal and the minimum carryover of nitrogen into the manure, which will reduce ammonia emissions from solid manure.

¹⁷ Page 81 of "Recommendations to the San Joaquin Valley Air Pollution Control Officer Regarding Best Available Control Technology for Dairies in the San Joaquin Valley" January 31, 2006
(http://www.valleyair.org/busind/pto/dpag/dpag_idx.htm).

Step 2 – Eliminate Technologically Infeasible Options

There are no technologically infeasible options to eliminate from step 1.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

The only control technology that is identified above is the use of the above listed achieved-in-practice control method, therefore ranking is not required.

Step 4 - Cost Effectiveness Analysis

The above listed control technology is achieved-in-practice; therefore a cost analysis is not required.

Step 5 - Select BACT

The most effective NH₃ control technology not eliminated in Steps 2 and 4 above is the following listed achieved-in-practice NH₃ control method:

- Rapid incorporation of solid manure into the soil after land application, and all animals fed in accordance with Natural Resources Conservation Services (NRCS) or other District-approved guidelines.

The applicant is proposing the use of the achieved-in-practice NH₃ control method. Therefore, BACT for NH₃ is being proposed.

IV. Top-Down BACT Analysis for Feed Storage and Handling (ATC Permit N-8441-5-1):

BACT Guideline 5.8.11 applies to the proposed modified feed storage and handling for feed/total mixed ration (TMR). In accordance with the District BACT policy, information from this guideline will be utilized without further analysis.

1. BACT Analysis for VOC Emissions from Feed/TMR

Step 1 - Identify all control technologies

Achieved-In-Practice

- District Rule 4570 Mitigation Measures for feed/TMR.

Technologically Feasible:

None

Alternate Basic Equipment:

None

Description of Control Technology

District Rule 4570 measures

District Rule 4570 requires the implementation of various management practices to reduce VOC emissions from TMR. These practices include pushing feed so that it is within three feet of feedlane fence within two hours of putting out the feed or use a feed trough or other feeding structure designed to maintain feed within reach of the animals, so the area of the feed is minimized and the feed can be consumed by the cows in a shorter time period instead of continuing to emit VOCs; beginning feeding total mixed rations within two hours of grinding and mixing rations, reducing the time that fresh feed emits VOCs; storing grain in a weatherproof storage structure or under a weatherproof covering from October through May; feeding steam-flaked, dry rolled, cracked or ground corn or other ground cereal grains; removal of uneaten wet feed from feeding areas; and preparing TMR with a minimum moisture content, which reduces VOC since most of the compounds emitted are highly soluble in water.

Step 2 – Eliminate Technologically Infeasible Options

There are no technologically infeasible options to eliminate from step 1.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

The only control technology that is identified above is the use of the above listed achieved-in-practice control method, therefore ranking is not required.

Step 4 - Cost Effectiveness Analysis

The above listed control technology is achieved-in-practice; therefore a cost analysis is not required.

Step 5 - Select BACT

The most effective VOC control technology not eliminated in Steps 2 and 4 above is the following listed achieved-in-practice VOC control method:

- District Rule 4570 Mitigation Measures for feed/TMR.

The applicant is proposing the use of the achieved-in-practice VOC control methods. Therefore, BACT for VOC is being proposed.

APPENDIX H

RMR and AAQA Summary

San Joaquin Valley Air Pollution Control District

Risk Management Review and Ambient Air Quality Analysis

To: Kai Chan – Permit Services

From: Diana Walker – Technical Services

Date: June 12, 2020

Facility Name: MANUEL OLIVEIRA DAIRY

Location: 4235 OAK AVE, MERCED

Application #(s): N-8441-1-1, -2-1, -3-2, -4-1, -5-1

Project #: N-1183853

1. Summary

1.1 RMR

Units	Prioritization Score	Acute Hazard Index	Chronic Hazard Index	Maximum Individual Cancer Risk	T-BACT Required	Special Permit Requirements
1	1.39	0.00	0.00	5.05E-08	No	No
2	42.40	0.23	0.06	3.15E-06 ²	No	No
3	77.40	0.01	0.00	8.67E-06	Yes	No
4	0.00	0.02	0.01	0.00E+00	No	No
5	N/A ¹	N/A ¹	N/A ¹	N/A ¹	No	No
Project Totals	151.81	0.26	0.08	1.19E-05		
Facility Totals	>1	0.26	0.08	1.19E-05		

Notes:

- There is no risk associated with Unit 5 as the District does not have an approved toxic speciation profile for dairy feed and storage handling operations.
- T-BACT is determined on a corral by corral basis.

1.2 AAQA

Pollutant	Air Quality Standard (State/Federal)				
	1 Hour	3 Hours	8 Hours	24 Hours	Annual
CO	N/A ¹		N/A ¹		
NO _x	N/A ¹				N/A ¹
SO _x	N/A ¹	N/A ¹		N/A ¹	N/A ¹
PM ₁₀				Pass ²	Pass ²
PM _{2.5}				Pass ³	Pass ³

Notes:

- Only emissions from PM 10 and PM 2.5 were calculated and used to compare to State and Federal Air Quality Standards.
- Modeled PM₁₀ concentrations were below the District SIL for fugitive sources of 10.4 µg/m³ for the 24-hour average concentration and 2.08 µg/m³ for the annual concentration.
- Modeled PM_{2.5} concentrations were below the District SIL for fugitive sources of 2.5 µg/m³ for the 24-hour average concentration and 0.63 µg/m³ for the annual concentration.

To ensure that human health risks will not exceed District allowable levels; the following shall be included as requirements for:

Unit # 1-1, 2-1, 3-2, 4-1, 5-1

1. No special requirements.

T-BACT is required for this unit because of emissions of Naphthalene, Acrylonitrile, and Tetra Cl Ethane which are VOCs.

2. Project Description

Technical Services received a request on August 8, 2019 to perform a Risk Management Review (RMR) and Ambient Air Quality Analysis (AAQA) for the following:

- Unit -1-1: MODIFICATION OF 910 COW MILKING OPERATION WITH ONE 30 STALL HERRINGBONE MILKING PARLOR TO INCREASE THE NUMBER OF MILK COWS TO 2,500 HEADS AND REPLACE THE EXISTING MILKING PARLOR WITH A 60 STALL PARALLEL MILKING PARLOR.
- Unit -2-1: MODIFICATION OF COW HOUSING - 910 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 1,040 MATURE COWS (MILK AND DRY); 901 SUPPORT STOCK (HEIFERS, CALVES AND BULLS); AND 2 FREESTALLS WITH FLUSH SYSTEM TO: INCREASE THE MAXIMUM NUMBER OF COWS TO 2,500 MILK COWS NOT TO EXCEED A COMBINED TOTAL OF 2,900 MATURE COWS (MILK AND DRY) AND 1,500 SUPPORT STOCK (HEIFERS AND CALVES); INSTALL TWO NEW FREESTALL BARN (5 & 6), TWO SHADE BARN (1 & 2) OVER EXISTING CORRALS, CALF HUTCHES, AND UPWIND/DOWNWIND WINDBREAKS.
- Unit -3-1: MODIFICATION OF LIQUID MANURE HANDLING SYSTEM CONSISTING OF ONE SETTLING BASIN; TWO STORAGE PONDS; MECHANICAL SEPARATOR(S); MANURE IS LAND APPLIED THROUGH FURROW IRRIGATION TO INSTALL THREE MECHANICALLY AERATED LAGOONS (391'X200'X10', 284'X203'X7', AND 345'X200'X7') AND INCREASE LIQUID MANURE PROCESSING DUE TO A CHANGE IN HERD PROFILE AS AUTHORIZED BY ATC PERMIT N-8441-2-1.
- Unit -4-1: MODIFICATION OF SOLID MANURE HANDLING CONSISTING OF MANURE STOCK PILES; SOLID MANURE APPLICATION TO LAND FOR AN INCREASE IN SOLID MANURE PROCESSING DUE TO A CHANGE IN HERD PROFILE AS AUTHORIZED BY ATC PERMIT N-3884-2-1.
- Unit -5-1: MODIFICATION OF FEED STORAGE AND HANDLING CONSISTING OF COVERED FEED STORAGE OR COMMODITY BARN(S) AND SILAGE PILE(S) FOR AN INCREASE IN TOTAL MIXED RATIONS DUE TO A CHANGE IN HERD PROFILE AS AUTHORIZED BY ATC PERMIT N-8441-2-1.

3. RMR Report

3.1 Analysis

The District performed an analysis pursuant to the District's Risk Management Policy for Permitting New and Modified Sources (APR 1905, May 28, 2015) to determine the possible cancer and non-cancer health impact to the nearest resident or worksite. This policy requires that

an assessment be performed on a unit by unit basis, project basis, and on a facility-wide basis. If a preliminary prioritization analysis demonstrates that:

- A unit's prioritization score is less than the District's significance threshold and;
- The project's prioritization score is less than the District's significance threshold and;
- The facility's total prioritization score is less than the District's significance threshold

Then, generally no further analysis is required.

The District's significant prioritization score threshold is defined as being equal to or greater than 1.0. If a preliminary analysis demonstrates that either the unit's or the project's or the facility's total prioritization score is greater than the District threshold, a screening or a refined assessment is required

If a refined assessment is greater than one in a million but less than 20 in one million for carcinogenic impacts (Cancer Risk) and less than 1.0 for the Acute and Chronic hazard indices (Non-Carcinogenic) on a unit by unit basis, project basis and on a facility-wide basis the proposed application is considered less than significant. For units that exceed a cancer risk of 1 in one million, Toxic Best Available Control Technology (TBACT) must be implemented.

Toxic emissions for this project were calculated using the following methods:

- Toxic emissions for the Cow Housing, Lagoon(s), and Milk Parlor(s) were calculated using emission factors derived from the District's evaluation of dairy research studies conducted by California colleges and universities. PM based toxic emissions for the Cow Housing were calculated using emission factors generated from using the worst case composite of the 1997 EPA speciation of Kern County feedlot soil.

These emissions were input into the San Joaquin Valley APCD's Hazard Assessment and Reporting Program (SHARP). In accordance with the District's Risk Management Policy, risks from the proposed unit's toxic emissions were prioritized using the procedure in the 2016 CAPCOA Facility Prioritization Guidelines. The prioritization score for this proposed facility was greater than 1.0 (see RMR Summary Table). Therefore, a refined health risk assessment was required.

The AERMOD model was used, with the parameters outlined below and meteorological data for 2013-2017 from Merced (rural dispersion coefficient selected) to determine the dispersion factors (i.e., the predicted concentration or X divided by the normalized source strength or Q) for a receptor grid. These dispersion factors were input into the SHARP Program, which then used the Air Dispersion Modeling and Risk Tool (ADMRT) of the Hot Spots Analysis and Reporting Program Version 2 (HARP 2) to calculate the chronic and acute hazard indices and the carcinogenic risk for the project.

The following parameters were used for the review:

Source Process Rates					
Unit ID	Process ID	Process Material	Process Units	Hourly Process Rate	Annual Process Rate
1	1	Milk Parlor VOC	lbs	0.10	618
2	1	Freestall Barn 3a VOC	lbs	0.00	10
2	2	Freestall Barn 3b VOC	lbs	0.13	1,187
2	4	Corral 1 VOC	lbs	0.054	466.50
2	4	Corral 2 VOC	lbs	0.054	466.50
2	5	Corral 3 VOC	lbs	0.017	139.00
2	6	Corral 4	lbs	0.041	513.60
2	6	Corral 5	lbs	0.041	513.60
2	6	Corral 6	lbs	0.041	513.60
2	6	Corral 7	lbs	0.041	513.60
2	6	Corral 8	lbs	0.041	513.60
2	8	Freestall Barn 5 VOC	lbs	0.60	5,610
2	8	Freestall Barn 5 PM10	lbs	0.063	550
2	9	Freestall Barn 6 VOC	lbs	0.85	7,480
2	9	Freestall Barn 6 PM10	lbs	0.083	734
2	10	Calf Hutches VOC	lbs	0.017	163
2	10	Calf Hutches PM10	lbs	0.004	45.00
3	1	Lagoon 1 VOC	lbs	0.025	219
3	2	Lagoon 2	lbs	0.025	219
3	3	Lagoon 3	lbs	0.025	219
3	4	Land App Liquid	lbs	0.086	751.80
3	5	Land App Liquid	lbs	0.053	465.40
3	6	Land App Liquid	lbs	0.27	2,363
4	1	Solid Pile Storage	lbs	0.28	2,450
4	4	Land App Solid	lbs	0.064	558.60
4	5	Land App Solid	lbs	0.040	345.80
4	6	Land App Solid	lbs	0.201	1755.60

Polygon Area Source Parameters				
Unit ID	Unit Description	Release Height (m)	No. Vertices	Area (m ²)
1	Milk Parlor 1	1.00	4	3027
2	Freestall Barn 3a	1.00	4	5540
2	Freestall Barn 5	1.00	4	6014
2	Corral 3	1.00	4	2670
2	Freestall Barn 6	1.00	5	9266
2	Freestall Barn 3b	1.00	4	5540
2	Corral 4 thru 8	1.00	4	2482
2	Corral 4 thru 8	1.00	4	2482
2	Corral 4 thru 8	1.00	4	2482
2	Corral 4 thru 8	1.00	4	927
2	Corral 4 thru 8	1.00	4	927
2	Corral 1 & 2	1.00	4	2670
2	Corral 1 & 2	1.00	4	2670
2	Calf Hutches	1.00	5	2386
3	Land App Liquid	0.00	6	1036495
3	Lagoon 1	0.00	4	4349
3	Lagoon 2	0.00	4	5897
3	Lagoon 3	0.00	4	6884
3	Land App Liquid	0.00	8	1078295
3	Land App Liquid	0.00	6	1001783
4	Land App Solid	0.00	8	1078295
4	Solid Pile Storage	1.00	4	1194
4	Land App Solid	0.00	6	1001783
4	Land App Solid	0.00	6	1036495

4. AAQA Report

The District modeled the impact of the proposed project on the National Ambient Air Quality Standard (NAAQS) and/or California Ambient Air Quality Standard (CAAQS) in accordance with District Policy APR-1925 (Policy for District Rule 2201 AAQA Modeling) and EPA's Guideline for Air Quality Modeling (Appendix W of 40 CFR Part 51). The District uses a progressive three level approach to perform AAQAs. The first level (Level 1) uses a very conservative approach. If this analysis indicates a likely exceedance of an AAQS or Significant Impact Level (SIL), the analysis proceeds to the second level (Level 2) which implements a more refined approach. For the 1-hour NO₂ standard, there is also a third level that can be implemented if the Level 2 analysis indicates a likely exceedance of an AAQS or SIL.

The modeling analyses predicts the maximum air quality impacts using the appropriate emissions for each standard's averaging period. Required model inputs for a refined AAQA include background ambient air quality data, land characteristics, meteorological inputs, a receptor grid, and source parameters including emissions. These inputs are described in the sections that follow.

Technical Services performed modeling for directly emitted criteria pollutants with the emission rates below:

Emission Rates (lbs/hour)						
Unit ID	Process	NOx	SOx	CO	PM10	PM2.5 ²
2	1	N/A ¹	N/A ¹	N/A ¹	0.063	0.018
2	2	N/A ¹	N/A ¹	N/A ¹	0.083	0.024
2	3	N/A ¹	N/A ¹	N/A ¹	0.004	0.001

Emission Rates (lbs/year)						
Unit ID	Process	NOx	SOx	CO	PM10	PM2.5 ²
2	1	N/A ¹	N/A ¹	N/A ¹	550	157.85
2	2	N/A ¹	N/A ¹	N/A ¹	734	210.66
2	3	N/A ¹	N/A ¹	N/A ¹	45.00	12.92

Notes:

1. Only emissions from PM 10 and PM 2.5 were calculated and used to compare to State and Federal Air Quality Standards.
2. Per the permit engineer, the PM 2.5 emissions are determined to be 28.7% of the total PM10 emissions.

5. Conclusion

5.1 RMR

The cumulative acute and chronic indices for this facility, including this project, are below 1.0; and the cumulative cancer risk for this facility, including this project, is less than 20 in a million. However, the cancer risk for one or more units in this project is greater than 1.0 in a million. **In accordance with the District's Risk Management Policy, the project is approved with Toxic Best Available Control Technology (T-BACT).**

These conclusions are based on the data provided by the applicant and the project engineer. Therefore, this analysis is valid only as long as the proposed data and parameters do not change.

5.2 AAQA

The ambient air quality impacts from PM₁₀ and PM_{2.5} emissions at the proposed dairy modification does not exceed the District's 24-hour or Annual interim threshold for fugitive dust sources.

6. Attachments

- A. Modeling request from the project engineer
- B. Additional information from the applicant/project engineer
- C. Prioritization score w/ toxic emissions summary
- D. Facility Summary

APPENDIX I

Quarterly Net Emissions Change (QNEC)

Quarterly Net Emissions Change (QNEC)

The Quarterly Net Emissions Change is used to complete the emission profile screen for the District's PAS database. The QNEC shall be calculated as follows:

QNEC = PE2 - PE1, where:

- QNEC = Quarterly Net Emissions Change for each emissions unit, lb/qtr
- PE2 = Post-Project Potential to Emit for each emissions unit, lb/qtr
- PE1 = Pre-Project Potential to Emit for each emissions unit, lb/qtr

The quarterly PE values are calculated as follows: PE (lb/yr) ÷ 4 (qtr/yr)

Using the annual PE2 and PE1 values previously calculated, the QNEC (lb/qtr) for each permit unit is shown below:

Milking Parlor						
	NOx	SOx	PM10	CO	VOC	NH3
Annual PE2 (lb/yr)	0	0	0	0	1,000	342
Daily PE2 (lb/day)	0.0	0.0	0.0	0.0	2.7	0.9
Quarterly Net Emissions Change (lb/qtr)	0.0	0.0	0.0	0.0	154.45	54.38
1:	0.0	0.0	0.0	0.0	154.45	54.38
2:	0.0	0.0	0.0	0.0	154.45	54.38
3:	0.0	0.0	0.0	0.0	154.45	54.38
4:	0.0	0.0	0.0	0.0	154.45	54.38

Cow Housing						
	NOx	SOx	PM10	CO	VOC	NH3
Annual PE2 (lb/yr)	0	0	7,176	0	30,337	70,216
Daily PE2 (lb/day)	0.0	0.0	19.7	0.0	83.0	192.3
Quarterly Net Emissions Change (lb/qtr)	0.0	0.0	-189.50	0.0	4,501.75	10,691.00
1:	0.0	0.0	-189.50	0.0	4,501.75	10,691.00
2:	0.0	0.0	-189.50	0.0	4,501.75	10,691.00
3:	0.0	0.0	-189.50	0.0	4,501.75	10,691.00
4:	0.0	0.0	-189.50	0.0	4,501.75	10,691.00

Liquid Manure Handling							
	NOx	SOx	PM10	CO	VOC	NH3	H2S
Annual PE2 (lb/yr)	0	0	0	0	4,480	14,416	348
Daily PE2 (lb/day)	0.0	0.0	0.0	0.0	12.2	39.5	0.9
Quarterly Net Emissions Change (lb/qtr)	0.0	0.0	0.0	0.0	317.28	1,420.17	0.0
1:	0.0	0.0	0.0	0.0	317.28	1,420.17	0.0
2:	0.0	0.0	0.0	0.0	317.28	1,420.17	0.0
3:	0.0	0.0	0.0	0.0	317.28	1,420.17	0.0
4:	0.0	0.0	0.0	0.0	317.28	1,420.17	0.0

Solid Manure Handling						
	NOx	SOx	PM10	CO	VOC	NH3
Annual PE2 (lb/yr)	0	0	0	0	1,079	8,322
Daily PE2 (lb/day)	0.0	0.0	0.0	0.0	3.0	22.8
Quarterly Net Emissions Change (lb/qtr)	0.0	0.0	0.0	0.0	108.71	1,265.28
1:	0.0	0.0	0.0	0.0	108.71	1,265.28
2:	0.0	0.0	0.0	0.0	108.71	1,265.28
3:	0.0	0.0	0.0	0.0	108.71	1,265.28
4:	0.0	0.0	0.0	0.0	108.71	1,265.28

Feed Storage and Handling						
	NOx	SOx	PM10	CO	VOC	NH3
Annual PE2 (lb/yr)	0	0	0	0	43,374	0
Daily PE2 (lb/day)	0.0	0.0	0.0	0.0	118.8	0.0
Quarterly Net Emissions Change (lb/qtr)	0.0	0.0	0.0	0.0	4,863.22	0.0
1:	0.0	0.0	0.0	0.0	4,863.22	0.0
2:	0.0	0.0	0.0	0.0	4,863.22	0.0
3:	0.0	0.0	0.0	0.0	4,863.22	0.0
4:	0.0	0.0	0.0	0.0	4,863.22	0.0